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AFTER BALI: THE U.N. CONFERENCE AND ITS IMPACT ON INTERNATIONAL CLIMATE CHANGE POLICY

HEARING

BEFORE THE

SELECT COMMITTEE ON ENERGY INDEPENDENCE AND GLOBAL WARMING HOUSE OF REPRESENTATIVES

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CONTENTS

Page

Hon. Edward J. Markey, a Representative in Congress from the Commonwealth of Massachusetts, opening statement 1
Prepared statement 3
Hon. F. James Sensenbrenner, Jr., a Representative in Congress from the State of Wisconsin, opening statement 5
Hon. Earl Blumenauer, a Representative in Congress from the State of Oregon, opening statement 6
Hon. Jay R. Inslee, a Representative in Congress from the State of Washington, opening statement 6
Hon. Stephanie Herseth Sandlin, a Representative in Congress from the State of South Dakota, opening statement 7
Hon. Emanuel Cleaver II, a Representative in Congress from the State of Missouri, opening statement 8
Hon. Jerry McNerney, a Representative in Congress from the State of California, opening statement 8
Hon. Hilda Solis, a Representative in Congress from the State of California, opening statement, ... 8
Prepared statement 10
Hon. John Hall, a Representative in Congress from the State of New York, opening statement 13
Hon. Marsha Blackburn, a Representative in Congress from the State of Tennessee, opening statement 13

WITNESSES

Mr. Alden Meyer, Director of Strategy and Policy, Union of Concerned Scientists 15
Prepared statement 18
Mr. Philip Clapp, Managing Director, Pew Environmental Group 31
Prepared statement 33
Ms. Christiana Figueres, Official Negotiator, U.N. Framework Convention on Climate Change and the Kyoto Protocol, Costa Rica 43
Prepared statement 45
Mr. Ned Helme, President, Center for Clean Air Policy 49
Prepared statement 52
Mr. Myron Ebell, Director, Energy and Global Warming Policy, Competitive Enterprise Institute 75
Prepared statement 77

Page

SUBMITTED MATERIALS

The Climate Change and Energy Security Challenge, Stephen D. Eule, U.S. Dept. of Energy, November 29, 2007 101
EPA Analysis of Bingaman-Specter Request on Global CO_2 Concentrations, U.S. EPA, Office of Atmospheric Programs, October 1, 2007 120
Stabilizing CO_2 Concentrations with Incomplete International Cooperation, Edmonds, Clarke, Lurz, and Wise, U.S. Dept. of Energy, October 2007 127
"Europe's Dirty Secret: Why the EU Emissions Trading Scheme Isn't Working", Open Europe, August 2007 156

AFTER BALI: THE U.N. CONFERENCE AND ITS IMPACT ON INTERNATIONAL CLIMATE CHANGE POLICY

WEDNESDAY, DECEMBER 19, 2007

HOUSE OF REPRESENTATIVES,
SELECT COMMITTEE ON ENERGY INDEPENDENCE
AND GLOBAL WARMING,
Washington, DC.

The committee met, pursuant to call, at 12:05 p.m. in Room 2318, Rayburn House Office Building, Hon. Edward J. Markey [chairman of the committee] presiding.

Present: Representatives Markey, Blumenauer, Inslee, Solis, Herseth Sandlin, Cleaver, Hall, McNerney, Sensenbrenner, Walden, and Blackburn.

Staff present: Morgan Gray, Joel Beauvais, and Ana Unruh Cohen.

The CHAIRMAN. This hearing of the Select Committee on Energy Independence and Global Warming is called to order.

During the last 2 weeks, delegates from more than 180 nations, including the United States, met in Bali, Indonesia, to begin the process of developing a post-2012 worldwide agreement to reduce global warming pollution. This past Saturday, these delegates adopted the Bali Action Plan, which puts in place a road map for negotiations over the next 2 years. This road map has been criticized for being too weak, too fuzzy and inadequate for leading us out of the climate wilderness. Today's hearing will shine a light on the Bali agreement and give us a sense of whether we are headed toward climate catastrophe or climate responsibility.

The Bali Action Plan rests on four key pillars of climate policy: reduction of global warming pollution, adaptation to global warming impacts, technology development and transfer to developing countries, and financial investment to aid developing countries.

This road map appears to represent real progress in a number of key areas. Most importantly, it marks the first time that developing countries have agreed to consider taking actions to reduce their global warming pollution. The road map also increases the focus on adapting to the impacts of global warming that the world can no longer avoid. It recognizes the need to develop and deploy clean technology and steer global investment toward low-carbon ventures, as well as the importance of avoiding tropical deforestation in combatting global warming.

The Bali Action Plan achieved these important steps forward despite being weakened by the continued opposition of the Bush administration. Initial drafts of the road map included language based on the latest science that recognized the need for global heat-trapping emissions to peak within the next 10 to 15 years before declining by more than half by 2050, with developing countries reducing emissions 25 to 40 percent below 1990 by 2020.

In the face of opposition from Bush administration negotiators backed by Japan, Russia and Canada, this action was dropped from the final action plan. These science-based guides to emission targets were relegated from front and center to a footnote in the final document.

Although inclusion of these guides would have strengthened the road map, the leaders gathered at Bali did succeed in opening the door to negotiations on a new global agreement. These negotiations represent an opportunity to address global warming comprehensively, but we still need global leadership to realize this opportunity.

One message that emerged from the world's leaders in Bali is that we cannot afford to wait any longer to take international action to address global warming. The question now is whether the Bush administration will continue to be a roadblock on this new path.

In the meantime, Congress has taken the critical first step to reduce our global warming pollution by passing a Democratic energy bill, which President Bush signed today. That raises the fuel economy standards of our vehicles for the first time in over 30 years and puts our national energy policy back on track. The energy bill is an important downpayment on solving the climate crisis, reducing U.S. global warming emissions by up to a quarter of what is needed to save the planet by 2030.

In the new year, Congress will begin work on a cap, auction and trade bill which will achieve the balance of the reductions needed and demonstrate the U.S. leadership that is essential to reach a global agreement under which all countries take action.

We are fortunate to have an outstanding panel of experts on the U.N. climate negotiations with us today. Many of our witnesses were in Bali, participating in the negotiations, and have graciously agreed to join us so soon after returning.

I look forward to hearing all of your thoughts on the outcome of the Bali conference and the next steps for international climate negotiations.

I would now like to recognize the ranking member of the committee, the gentleman from Wisconsin, Mr. Sensenbrenner.

[The prepared statement of Mr. Markey follows:]

THE SELECT COMMITTEE ON
ENERGY INDEPENDENCE AND GLOBAL WARMING

Opening Statement for Chairman Edward J. Markey
"After Bali – the UN Conference and
Its Impact on International Climate Change Policy"
Select Committee on Energy Independence and Global Warming
December 19, 2007

This hearing is called to order.

During the last two weeks, delegates from more than 180 nations, including the United States, met in Bali, Indonesia to begin the process of developing a post-2012 worldwide agreement to reduce global warming pollution. This past Saturday, these delegates adopted the Bali Action Plan, which puts in place a roadmap for negotiations over the next two years. This roadmap has been criticized for being too weak, too fuzzy and inadequate for leading us out of the climate wilderness. Today's hearing will shine a light on the Bali agreement and give us a sense of whether we are headed towards climate catastrophe or climate responsibility.

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Although inclusion of these guides would have strengthened the roadmap, the leaders gathered at Bali did succeed in opening the door to negotiations on a new global agreement. These negotiations represent an opportunity to address global warming comprehensively, but we still need global leadership to realize that opportunity. One message that emerged from the world's leaders in Bali is that we cannot afford to wait any longer to take international action to address global warming. The question now is whether the Bush Administration will continue to be a roadblock in this new path.

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I would now like to recognize the gentleman from Wisconsin, Mr. Sensenbrenner.

Mr. SENSENBRENNER. Thank you very much, Mr. Chairman.

Last week in Bali, Indonesia, a speaker at the U.N. climate change conference had some pointed comments about what must happen in order to achieve a meaningful agreement on global warming. The speaker had firsthand knowledge of the political landscape in the United States.

The speaker said that international negotiators had to move away from failures that have hampered global warming talks since the U.N. framework convention on climate change had its first meeting in Berlin 12 years ago in 1995. The speaker, referring to the so-called Berlin mandate, said that the meeting put in place an inadequate process that exempted China, India and other developing nations from taking significant steps to reduce emissions by exempting these nations. The speaker said it made the subsequent Kyoto Treaty impossible to ratify in the United States Senate.

The speaker warned that negotiators in Bali must not make the same mistake of exempting China and India and other developing nations. The speaker said that many in the United States were ready to move forward with substantial greenhouse gas reductions but not, and I quote, “without the knowledge that other folks are cutting in a way that is meaningful,” unquote. The speaker wisely said that technology transfer and assistance with developing countries is crucial. To quote the speaker again, quote, “The industrial world can’t do it alone,” unquote.

And while that speaker at Bali and I disagree on many global warming policy proposals, I am pleased that my Chairman’s own junior Senator, John Kerry of Massachusetts, grasped the importance of enjoining China and India in the process.

Senator Kerry’s statements are a breath of cool, fresh air when compared to those of another American who spoke in Bali. While Senator Kerry laid out conditions that must be met in order for a global warming treaty to be approved by the United States Senate, another former presidential candidate simply laid blame for lack of promise at the feet of America. And while Vice President Al Gore was calling America the obstructionist at the Bali conference, he failed to notice that other nations were joining the United States in opposing the mandatory reduction targets in the Bali road map.

Mr. Gore also failed to acknowledge that China and India initially refused to commit to taking actions on their own to reduce emissions before eventually accepting that they need to be part of the solution too. And I am very pleased that China and India agreed to language in the Bali road map for, quote, “nationally appropriate mitigation actions that must be measurable, reportable and verifiable.”

While there are some provisions in the Bali road map that raise concern, I think overall it is a good agreement. Negotiators have given policymakers all over the world the time to promote the development of technology that will make emissions restrictions achievable without damaging the economy and hurting jobs and thus making those restrictions and changes politically untenable in any democratic country in the world.

If China and India were willing to work with the international community, it is possible to develop the meaningful climate change treaty that creates real environmental benefits, protects jobs in the economy and advances technology. Without China and India, any global warming treaty would simply be an invitation for manufacturers to move their options to these unregulated economies. And where would our economy and environment be?

I opposed the Kyoto Treaty from the start because I knew what we were getting into with that flawed agreement. And I am disappointed that there are those in this country that did not heed what Senator Kerry said then and what he said 10 years ago when the Byrd-Hagel resolution came up.

And because those cautions were not heeded, the Senate didn't ratify the treaty, and eventually we lost at least a decade and probably more in reaching an agreement that could be worldwide in application, was technology-based and which would be politically acceptable, both in this democracy as well as in other democracies around the world.

I hope that this road map from Bali can start us on the path toward a more realistic and effective global emissions reduction solutions, but I must caution everybody that if we fall into the trap of what caused Kyoto to fail, then we will be losing even more time in this fight.

I thank the gentleman, and I yield back the balance of my time.

The CHAIRMAN. Great. The gentleman's time has expired, and the Chair recognizes the gentleman from Oregon, Mr. Blumenauer.

Mr. BLUMENAUER. Thank you, Mr. Chairman. I am looking forward to this hearing today so that we can learn about what happened in Bali and what we do with that experience.

The good news is that that will be the last international gathering of that scope where the United States is totally isolated from not just the rest of the developed world, but probably the rest of the world in total. And I count that as a singular bright spot.

But just because we have been isolated does not mean that we haven't a great deal of leadership going on in this country. And I appreciate the reference to Al Gore, so derided by some as "the ozone man," who has had a consistent message for years and is now recognized globally for being right and being effective in moving us in the right direction. We also have a great cross-section of people who have been involved with the leadership in this country, a slice of what is happening in terms of the NGOs, the private sector, unions, over 750 cities, which I find extraordinarily exciting.

There is still time for this Congress, under the leadership of you, Mr. Chairman, and this committee and others, to be able to have singular accomplishments before we conclude. And I think the combination of what has happened in Bali, the international consensus, the leadership on the ground, means that it is much more likely that the focus of this election is going to mean that not only will we make some success in 2008, but the stage will be set for a new era of American policy.

And I look forward to starting to get a glimpse of some of the specifics, as we listen to our witnesses here today.

The CHAIRMAN. The gentleman's time has expired.

The Chair recognizes the gentleman from Washington State, Mr. Inslee.

Mr. INSLEE. Thank you.

As far as when we talk about the road from Bali, I just want to note that this is moving so fast, both in the wrong direction and the right direction, that we ought to have both concern and optimism.

It is moving in the wrong direction because the science, as we know, is astoundingly rapid at giving us signals that things are going out there, particularly feedback mechanisms in the far north, that are 20 times disturbing as they were 2 or 3 years ago.

The good news is that the people of this country are changing so rapidly on this issue and the science of the technology of dealing with energy solutions to this are becoming so available to us that we ought to have some optimism following Bali.

And I just want to tell one little story why we ought to have optimism. About 3 years ago, I asked former Vice President Al Gore to address our colleagues about this issue. It was about 3 years ago, and it was in this building. And we asked all the Members of the House of Representatives to come listen to him. Four members of the United States House of Representatives showed up to listen to the former Vice President of the United States. Now the world is giving him the Nobel Peace Prize.

And I encourage anyone who is interested in this subject to read his speech at Bali. It was a work of genius, and it is a mark not just of individual achievement but a global action. And I just think we ought to come away from Bali with a sense of optimism to see how fast things are changing.

And, with that, I will yield back my time.

The CHAIRMAN. The gentleman's time has expired.

The Chair recognizes Ms. Herseth Sandlin from South Dakota.

Ms. HERSETH SANDLIN. Thank you, Mr. Chairman. Thank you for having this hearing.

I want to thank all of our witnesses for their participation in Bali and for being here today. I apologize I won't be able to stay for the testimony, but I, again, wanted to thank you for taking the time to talk about the next steps and the work of this select committee and the priority of the 110th Congress and continuing to make progress domestically as well as working with international partners in sharing information.

And I would have to share—I want to reiterate the statement made by Mr. Inslee about having some optimism. While there are going to be different interpretations about the road map itself and how it compares to the objectives of the conference, I do think that hopefully we can at least agree that the road map has us going in the right direction. We are not off-course. We have made some progress in the last couple of years, at least acknowledging with what the science has provided and the negotiations over the last couple of weeks of the direction we need to go.

But in the 3½ years that I have been in Congress, I have watched a dramatic shift in one area in particular. As Mr. Inslee was describing, in terms of how fast things are changing, not only in terms of the science, but the political views that people have about certain things, where they may have had a certain position over the last 10 to 15 years and now all of a sudden they are changing their positions, as my friend from New York, Mr. Eliot Engel, has done on the issue of biofuels.

And so, when we have gone from huge resistance to biofuels in some corners to a signing of a bill that has a 36-billion-gallon target by 2022, addressing, as we will have to, some of the issues that will arise over the next few years, again, we should have some optimism that we are going in the right direction, that there is more progress to be made, but we still haven't yet agreed on the precise destination we are trying to get to.

But I have no doubt that over the next few months, and certainly heading into the next year or 2, that we will continue to make progress. And we appreciate the strong efforts that all of you have made in getting us to the consensus that we have achieved thus far and the consensus that we hope to achieve in the months ahead.

So, again, I thank you all for being here. We look forward to working with you as we figure out the destination.

Thank you. I yield back.

The CHAIRMAN. The gentleman from Oregon is recognized.

Mr. WALDEN. Mr. Chairman, thank you. I am going to waive my opening statement and look forward to hearing the testimony of the witnesses.

The CHAIRMAN. The Chair recognizes the gentleman from Missouri, Mr. Cleaver.

Mr. CLEAVER. I, too, would waive my opening comments. I am extremely interested in hearing from the panelists on whether or not they view this major economy's process as being competitive with the Kyoto Protocol or, maybe more significantly, whether or not it is undermining the Kyoto Protocol.

So thank you, Mr. Chairman, for calling this hearing, and I look forward to hearing more detailed—or a detailed response from our witnesses.

The CHAIRMAN. The gentleman's time has expired.

The Chair recognizes the gentleman from California, Mr. McNerney.

Mr. MCNERNEY. Thank you, Mr. Chairman.

First, I want to commend the members who have participated in the Bali conference for their hard work and for their accomplishment. I recognize the challenges ahead. They are going to be difficult. They are very big. But I am very optimistic because both of the technology that I see already in play but also because we are opening up, this cooperation is opening up a new chapter in human history, a chapter of cooperating worldwide to solve global problems. And so I look at this as a tremendous achievement.

I thank the participants, and I yield back the balance of my time.

The CHAIRMAN. The gentleman's time has expired.

The Chair recognizes the gentlelady from California, Ms. Solis.

Ms. SOLIS. Thank you, Mr. Chairman. I will be brief.

I just want to welcome our panelists also, and I watched with much amusement at the behavior of the United States at the particular meeting in Bali. I was very disappointed, very disappointed, because so many of us here in the Congress have been working very hard on trying to educate our communities, especially communities of color, but, more importantly, the messages that are sent out to third world countries. And, in particular, I am thinking about countries that have been hardest hit by droughts and fires and hurricanes. And I look south of the border, I look to Latin America, and I see that folks there are looking for leadership. And I know, while we have the technology, we have the know-how, we have the financial resources, that we should be providing a bigger role on a bigger level.

So I am very anxious to hear what you have to say. Many of us here are excited. I know my staff and I worked on getting an amendment into the foreign operations spending package that would require, for the first time, the Secretary of State to convene an interagency committee to provide Congress with a report describing the needs of developing countries and the actions planned to help provide for their needs.

This is a major, major concern of ours here in the House. And I am happy to say that, in spite of what the administration may say, those of us here, as representatives for our constituents, are strongly in support of advancing whatever we need to do to make sure that our communities are well taken care of and that we play an active role in combatting the negative effects of global warming in our planet and in our country and in our neighborhoods.

Thank you very much. I yield back the balance of my time.

[The statement of Ms. Solis follows:]

Opening Remarks of Congresswoman Hilda L. Solis
Select Committee – Hearing on Follow-Up to Bali
December 19, 2007

- Chairman Markey, thank you for holding today's hearing.

- While I am pleased that Conference established a roadmap to negotiate a new agreement at the 15th Meeting of the Parties, I am very concerned about the reports that the U.S. delegation obstructed progress on these talks.

- Climate change poses one of the greatest challenges to promoting development and reducing poverty around the globe.

- With less capacity to cope with these changes, the world's poorest people will bear the brunt of these impacts even though they are the least responsible for its cause.

- I am very concerned about the impacts climate change will have in our hemisphere.

- This year alone Mexico suffered from two category 5 hurricanes and major flooding, and fires ravaged southern California.

- While climate change did not directly cause these incidents, it is responsible for creating conditions ripe for these and other extreme events.

- The cost of prevention is far lower than the cost of conflict, both in financial terms and in human lives and I believe that adaptation assistance must be part of any mandatory emission reduction plan.

- I am pleased that an amendment I offered during consideration of the energy bill was included in the Foreign Operations spending package.

- This amendment would require the Secretary of State to convene an interagency committee to provide Congress with a report describing the needs of developing countries and the actions planned to help provide for these needs.

- As a major contributor to climate change, the U.S. must be a leader in the effort to achieve a framework for mandatory global warming emission reductions.

- While an agreement was reached at Bali, I hope that we can demonstrate by deed our commitment to a global solution to climate change.

- I yield back the balance of my time.

The CHAIRMAN. Great. The gentlelady's time has expired.

The Chair recognizes the gentleman from New York State, Mr. Hall.

Mr. HALL. Thank you, Mr. Chairman.

And thank you to our witnesses for your work and for coming here to tell us about it.

I am one who was raised to believe that the United States should be a leader in many spheres of government and policy. And this is one in particular that we should not lag any further on. We should not only join the rest of the world in working for reduction of greenhouse gases, but we should be leading.

And I, of course, would love to see China, India and all countries of the world join in, but I don't think we should hold back, because leaders do not hold back. They set the example for the rest of the world.

People in my district and the people I know around the country who I speak to see the changes in the weather. They know about the drought in Georgia that is so extreme that boats and docks and marinas are far from where the water is. They know in our district about the three 50-year floods in the last 3 years. They know about the ice storm in the Midwest that was deadly to many people; the 139-mile-per-hour hurricane-force storm that hit the Northwest States; the typhoon that decimated Bangladesh; the multiple extreme hurricanes that hit the Yucatan this year; the tornado that destroyed the town of Greensburg, Kansas, and on and on. These are phenomena that may be isolated but are probably a part of the predicted pattern of increased intensity and frequency of storms.

I have seen several examples recently of ways of developing and using energy. I just drove a hydrogen car that GM is developing, which, especially if they get hydrogen from water rather than from natural gas, I am optimistic that that is a possible solution to part of the problem. And of course the verdant hydrokinetic tide-powered experiments that are going on in the East River in New York are very promising.

The last thing I want to say, just because this is Christmastime or holiday time of giving for many people of many faiths, if you know somebody who has everything and you want to give them something that will help mitigate the impacts of global warming, you can go on the Internet and search for how to adopt a polar bear and give a polar bear to somebody who has everything. And that bear will be followed; their habitat will be protected. And you can teach people, at the same time, about the changes going on in the arctic as a result of this problem.

And, with that, I yield back. And thanks for holding this hearing, Mr. Chairman.

The CHAIRMAN. I thank you very much.

And just before we end it, the gentlelady from Tennessee, Mrs. Blackburn, has arrived. And she is recognized for an opening.

Mrs. BLACKBURN. I thank you, Mr. Chairman.

And welcome to all of our witnesses today. Thank you for the hearing and the time.

We all know that on December 15th the U.N. completed a 2-week conference in Bali, Indonesia, and it was attended by representatives of more than 180 countries. And the attendees completed the conference by establishing an Adaptation Fund Board to oversee the implementation of the adaptation fund created under the Kyoto Protocol. Delegates also considered policies to reduce emissions from deforestation and forest degradation in developing countries.

However, I have two main concerns about the general path that the U.N. conference in Bali proposes, and these are concerns I want to address with you all today.

First, the conference seeks to implement severe CO_2 restrictions worldwide in an attempt to prevent global warming. And, as we are hearing, global warming has little to do with human activities. So that one is of concern to me.

Data is increasingly surfacing in peer-reviewed journals that show climate change may or may not be a problem. Further, much of the data in the climate models that the IPCC have used and some that the Bali road map is based upon are appearing to pose questions, and the credibility is being questioned on those.

Emerging data suggest that recent global warming over the past hundred years may not be caused by human CO_2 emissions. Instead, the data tells us that the warming could be well within the natural variability and largely determined by changes in the sun.

So that is one area that I would like to travel with you all.

Second, the conference wants to institute a world carbon market to track and manage CO_2 emissions. Last year, some of my colleagues and I went on a fact-finding mission to Europe to look at their emissions trading scheme. I found it curious that they called it a "scheme." And what we found was a system that maybe wasn't as credible as we would like to see it; that it didn't reduce the CO_2 emissions and, in some cases, might have even aided the increase.

So, to force this type of system on every industrialized nation is not going to be something that is going to stop global warming. We have to look at what the benefits and the causes and the cost are going to be and then look at how we need to address other issues that may be more pressing problems that we can do something about: diseases, malnutrition and sanitation.

So thank you, Mr. Chairman. I look forward to the questions. And welcome to our witnesses.

The CHAIRMAN. I thank the gentlelady.

All time for opening statements by members of the committee has expired, so we will turn to our panel. And our first four witnesses today all participated in the Bali conference.

We will begin with Mr. Alden Meyer, director of strategy and policy for the Union of Concerned Scientists. Mr. Meyer has, for over 30 years, had experience working on issues of energy and climate change, both at the State and national level. Before coming to the Union of Concerned Scientists in 1989, Mr. Meyer served as executive director for the League of Conservation Voters, Americans for the Environment, and the Environmental Action Foundation.

We welcome you, Mr. Meyer. Please begin.

STATEMENTS OF MR. ALDEN MEYER, DIRECTOR OF STRATEGY AND POLICY, UNION OF CONCERNED SCIENTISTS; MR. PHILIP CLAPP, DEPUTY MANAGING DIRECTOR, PEW ENVIRONMENT GROUP; MS. CHRISTIANA FIGUERES, OFFICIAL NEGOTIATOR, U.N. FRAMEWORK CONVENTION ON CLIMATE CHANGE AND THE KYOTO PROTOCOL, COSTA RICA; MR. NED HELME, PRESIDENT, CENTER FOR CLEAN AIR POLICY; MR. MYRON EBELL, DIRECTOR, ENERGY AND GLOBAL WARMING POLICY, COMPETITIVE ENTERPRISE INSTITUTE

STATEMENT OF ALDEN MEYER

Mr. MEYER. Thank you, Chairman Markey and members of the select committee. UCS has been active on international, national and State climate change policy since 1989, and I have personally attended almost all of the international negotiating meetings on climate change since 1991 when negotiations started over the original Rio Framework Treaty. I am pleased to be able to share with you my observations on the Bali negotiations.

I do believe this meeting reflected a sea change in the willingness of both developed and developing countries to move forward together in confronting the climate threat and really opens the way for serious negotiations over the next 2 years.

Substantial scientific evidence indicates that an increase in the global average temperature more than two degrees Celsius above pre-industrial levels would pose severe risks to natural systems and human health and well-being. Limiting warming to this level will require global emissions to peak within the next 10 to 15 years and then be reduced by 50 percent or more by mid-century, with much deeper cuts for industrialized countries.

In the late 1990s, you may recall companies opposed to U.S. ratification of the Kyoto Protocol ran television commercials with the theme, “It is not global, and it won’t work,” because countries like China and India did not take on binding emissions targets under the initial Kyoto framework. The most important outcome of Bali, in my mind, is the full recognition that the climate change problem is global and that we all have a stake in addressing it.

In Bali the world saw the dismantling of the so-called Berlin wall, the famous phrase, the 1995 Berlin mandate that Mr. Sensenbrenner referred to, that prohibited any new commitments for parties not included to Annex 1 of the framework convention, non-industrialized countries. The president of Indonesia captured it well in his keynote address to the meeting: “Developing countries, too, must do our part. The bottom line is that we all must do something differently and do something more.”

The new Australian Prime Minister, Kevin Rudd, put it starkly: “The community of nations must reach agreement. There is no plan B. There is no other planet any one of us can escape to; we have only this one. And none of us can do it alone, so let’s get it right.”

And the Minister from India captured the true spirit of Bali when he said, “What is at stake is saving our future generations. And therefore it is not a question of what you will commit or what I will commit, it is a question of what we will commit together to meet that challenge.”

Through the constructive efforts in Bali of countries like China, Brazil, Indonesia, South Africa and others, Costa Rica, with last-minute acquiescence of the U.S., negotiations have been launched under the framework convention on nationally appropriate mitigation actions by developing country parties, as well as on post-2012 emission reduction commitments for the U.S. and other non-Kyoto industrialized countries.

Simultaneously, negotiations over deeper emission reduction obligations of industrialized countries that have ratified Kyoto, including most recently Australia, will continue in the ad-hoc working group launched in 2005 in Montreal. These two negotiating tracks will proceed in parallel with comparability of action required for all developed countries.

Consensus could not be reached on the level of ambition for these negotiations, as the U.S. fought hard to keep any specific reference to the need for industrialized countries to reduce their emissions 25 to 40 percent below 1990 levels by 2020 out of the convention track decision.

In the closed working group negotiations, developing countries said they could accept a reference to a need for global emissions to peak in the next 10 or 15 years and to be reduced by 50 percent or more by mid-century. This would have been a significant achievement, given that achieving such a goal would require substantial reductions in projected emissions for big developing countries like China, India and Brazil.

But these countries made it crystal clear they could only support such a goal if it were to be accompanied by the language on 25 to 40 percent reductions in emissions by industrialized countries by 2020. The U.S. was unwilling to cut this deal, falsely claiming that inclusion of such a range would, quote, “prejudge,” unquote, the outcome of the negotiations. In my view, this was a significant missed opportunity. But the science-based language remains in the Kyoto track decision, along with the comparability language in the Bali action plan, so you can argue, by reference, it applies to the United States.

While the language on mitigation actions by developed and developing countries generated the most intense debate in Bali, there are a number of other important building blocks included in the Bali Action Plan, which I describe more fully in my prepared testimony. These include adaptation, as Ms. Solis referred to; helping vulnerable developing countries deal with significant impacts of climate change that are already apparent and will only worsen in the future; reducing emissions from deforestation and forest degradation, which accounts for an estimated 20 percent of global CO_2 emissions, equal to the total emissions of the U.S. or China and more than the total emissions of the transportation sector worldwide; and strategies to facilitate the development transfer and accelerated deployment of clean technologies, along with greater access to financing and capacity-building for developing countries.

Putting flesh on the bones of the technology and financing elements of the Bali Action Plan is key to reaching agreement over the next 2 years on sectoral policy-based and other mitigation commitments by developing countries to help decarbonize their future development path. The fact that, at the end of the day, the Bush administration was unwilling to block these negotiations from going forward is a hopeful sign, for, while a different U.S. team will be on the field during the second half of negotiations, it would have been a tragic waste of time to run out the clock.

Finally, Mr. Chairman, in her speech during the high-level segment, Connie Hedegaard, the Minister of Denmark, which will host the meeting in December 2009 where the new agreement will hopefully be reached, laid out a clear challenge to the U.S.: “It is about time that we act in a collective, constructive and timely manner. For almost a century, Europe has looked to the U.S. for leadership and guidance in times of instability and change. We do so yet again as we strive to reach a truly comprehensive agreement to combat climate change. But we do so knowing full well that all countries, not just the largest emitters, share responsibility for the final outcome.”

I hope, Mr. Chairman, that we will heed Minister Hedegaard’s wise words as we move forward from Bali to Copenhagen.

[The statement of Mr. Meyer follows:]

The Bali Action Plan
And the Road to Copenhagen

Testimony of Alden Meyer,
Director of Strategy and Policy,
Union of Concerned Scientists
Before the House Select Committee on
Energy Independence and Global Warming

December 19, 2007

The Urgency of the Challenge, and the Role of the United States

Substantial scientific evidence indicates that an increase in the global average temperature of more than two degrees Celsius (°C) above pre-industrial levels poses severe risks to natural systems and human health and well-being. Sustained warming of this magnitude could, for example, result in the extinction of many species and extensive melting of the Greenland and West Antarctic ice sheets—causing long-term global sea level rise of between 12 and 40 feet. In light of this evidence, policymakers in the European Union have called for a long-term goal of limiting warming to 2°C above pre-industrial levels.

The world has already experienced a temperature increase of about 0.8 degrees C above pre-industrial levels, and the Intergovernmental Panel on Climate Change notes that about 0.6 degree C of additional warming is already unavoidable due to past emissions. Scientific studies indicate that, to have at least a 50-50 chance of preventing temperatures from rising above this level, we must stabilize the concentration of heat-trapping gases in the atmosphere at or below 450 parts per million CO2-equivalent. To meet this target, worldwide cumulative emissions of heat-trapping gases must be limited to approximately 1,700 gigatons (Gt) CO2eq for the period 2000–2050—of which approximately 330 GtCO2eq has already been emitted. Staying within this 1,700 GtCO2eq "global cumulative emissions budget" will require aggressive reductions in emissions of both industrialized and developing nations.

Recent analysis by UCS[1] determines that the United States' share of this global emissions budget ranges from 160 to 265 GtCO2eq for the period 2000–2050, of which approximately 45 GtCO2eq has already been emitted, and that even assuming aggressive assumptions about reductions by other nations, the United States should reduce its emissions by *at least* 80 percent below 2000 levels by 2050.

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[1] How to Avoid Dangerous Climate Change: A Target for US Emissions, September, 2007, available at http://www.ucsusa.org/assets/documents/global_warming/emissions-target-report.pdf

The United States has agreed in principle to work with more than 180 other nations under the United Nations Framework Convention on Climate Change to bring about the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic [human-caused] interference with the climate system." Though the federal government has done little to live up to that agreement thus far, there is now growing momentum to pursue deep reductions in emissions of carbon dioxide (CO2) and other heat-trapping gases that cause global warming. California, Florida, Hawaii, Minnesota, New Jersey, Oregon, and Washington have all enacted laws or established policies setting global warming pollution reduction targets, while states in the Northeast, the West, and, most recently, the Midwest have signed agreements to achieve regional emissions reduction targets. Legislation setting declining caps on US global warming emissions has been reported out of the Senate Environment and Public Works Committee, and 176 Representatives have co-sponsored such legislation in the House. More and more business leaders are calling for mandatory caps on U.S. global warming pollution, and climate change and energy security are already major issues in the 2008 presidential campaign.

The Spirit of Bali

During the first two weeks in December, the nations of the world gathered in Bali, Indonesia for the 13th Conference of the Parties to the UNFCCC, as well as the 3rd meeting of the Parties to the Kyoto Protocol. While there were a number of issues on the agenda, the major focus of the negotiations was on the nature of the multilateral framework needed to address climate change after 2012, when the Kyoto Protocol's first commitment period expires.

Recall that in the late 1990s, companies opposed to US ratification of the Kyoto Protocol ran television commercials with the theme "It's not global and it won't work," referring to the fact that under Kyoto, only industrialized countries took on binding emissions limitation or reduction targets. In my view, the most important outcome of the Bali negotiations is the full recognition that when it comes to the future of the climate change treaty regime, the problem *is* global, and we *all* must have a stake in making it work. In Bali, the world saw the dismantling of "the Berlin wall," the famous phrase in the 1995 Berlin Mandate that launched negotiations resulting two years later in the Kyoto Protocol prohibiting "any new commitments for Parties not included in Annex 1" to the Framework Convention.

The President of Indonesia, Dr. Susilo Bambang Yudhoyono, captured it well in his keynote address to the high-level segment of the Bali COP on December 12th:

> Developing countries too must do our part. Developing countries must commit to a path of sustainable development by mainstreaming the environment in our national development plans. Those blessed with forests must do all they can to preserve and expand their forest cover. Developing countries experiencing high economic growth must avoid the mistakes of earlier industrial nations by planning a long-term low-carbon development. Developing countries can also take advantage of a rapidly expanding carbon market to harness opportunities for the socio-economic development.
>
> Both developed and developing countries can work together to mainstream mitigation and adaptation into their national development strategies. Both can learn how to achieve higher economic growth without producing higher emissions. Both can work to enhance the use of non-fossil energy including renewable energy. And both can work together to help nations, including low-lying island nations, that are most vulnerable to the impacts of global warming.

> The bottom line is that we all must do something differently, and do something more.

The Indonesian president's remarks capture well the "spirit of Bali," a clear move towards collaboration between North and South, and away from the confrontation and polarization that has all too long characterized negotiations on this issue. As much as all of the decisions made and all of the processes launched in Bali, this new spirit is the real watershed. For we know, all of us, the magnitude of the challenge ahead, and we understand that only through true collaboration can we come to grips with the threat posed by global warming. We can no longer afford (not that we ever could) to point fingers at each other and say "your end of the boat is sinking." For the fact is, we are all in this together. As the new Australian Prime Minister, Kevin Rudd, put it in his remarks to the high-level segment last Wednesday:

> The community of nations must reach agreement. There is no Plan B. There is no other planet any of us can escape to. We only have this one. And none of us can do it alone. So let's get it right. The generations of the future will judge us harshly if we fail. But I am optimistic that with clarity of purpose, clear-sightedness, courage and commitment we can prevail.

The Bali Action Plan

Because of the constructive efforts in Bali of countries like China, Brazil, Indonesia, and South Africa, and the last-minute acquiescence of the United States, negotiations have been launched that will include discussion of "nationally appropriate mitigation actions by developing country Parties...supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner." Simultaneously, negotiations over extending and deepening the emissions reduction obligations of most industrialized countries under the Kyoto Protocol will continue in the Ad Hoc Working Group launched at the first meeting of the Kyoto Parties in 2005 in Montreal, and negotiations over post-2012 emissions reduction commitments for the United States and other Annex 1 countries that have not ratified the Kyoto Protocol will occur in the Ad Hoc Working Group on Long-Term Cooperative Action created in Bali last Saturday.

The decision outlining the next two years of negotiations on industrialized country reduction commitments under Kyoto notes that the Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change “indicates that global emissions of greenhouse gases (GHGs) need to peak in the next 10 to 15 years and be reduced to very low levels, well below half of levels in 2000 by the middle of the twenty-first century in order to stabilize their concentrations in the atmosphere at the lowest levels assessed by the IPCC to date in its scenarios.” It also notes that “the AR4 indicates that achieving the lowest levels assessed by the IPCC to date and its corresponding potential damage limitation would require Annex I Parties as a group to reduce emissions in a range of 25 to 40 per cent below 1990 levels by 2020,” and that “achievement of these reduction objectives by Annex I Parties would make an important contribution to overall global efforts required to meet the ultimate objective of the Convention as set out in its Article 2.”

In the negotiations over the Convention track decision, the United States fought hard to keep any such specific reference to quantitative emissions reductions for industrialized countries out of the preambular text. In the intense working group negotiations over the two days before the final COP plenary on Saturday, major developing countries had indicated a willingness to accept language in the decision referring to the need for global emissions to peak in the next 10 to 15 years and to be reduced by 50 percent or more by mid-century. This would have been a significant achievement, given that achieving such a goal would require substantial reductions in projected emissions for big developing countries like China, India, and Brazil, along with deep cuts in emissions by industrialized countries. But these countries made clear they could only support such a goal if it was accompanied by the language on 25 to 40 percent reductions in emissions by industrialized countries by 2020, which the United States was unwilling to do, falsely claiming that inclusion of such a range would "prejudge" the outcome of the negotiations. Instead of such explicit recognition of the scale of emissions reductions needed to avoid the worst impacts of global warming, the final decision merely includes a footnote referring to the relevant IPCC text on emissions scenarios. In my view, this was a significant missed opportunity.

While the subparagraphs on mitigation actions by developed and developing countries generated the most intense debate in Bali, there are a number of other notable aspects, or "building blocks," included in the Bali Action Plan.

Adaptation

No matter how successful the world proves to be in limiting future greenhouse gas emissions, there will be significant impacts of climate change, particularly on vulnerable developing countries. The two-year negotiations launched in Bali will include discussion of ways to foster "international cooperation to support urgent implementation of adaptation actions, including through vulnerability assessments, prioritization of actions, financial needs assessments, capacity-building and response strategies, integration of adaptation actions into sectoral and national planning, specific projects and programmes, means to incentivize the implementation of adaptation actions, and other ways to enable climate-resilient development and reduce vulnerability of all Parties." Estimates by the World Bank, Oxfam and others indicate that upwards of $50 billion a year is likely to be needed for developing country adaptation actions; this is about two orders of magnitude higher than the resources currently available for such efforts. Identifying strategies to generate dedicated, sustained funding for adaptation strategies will be one of the central challenges of the next two years of negotiations.

Technology

Everyone acknowledges that development, transfer, and accelerated deployment of clean energy, transportation, and other technologies is key to meeting the climate change challenge, and the United States and other industrialized countries took on obligations in this area when we ratified the Framework Convention. There is widespread agreement that much more must be done to carry out these obligations, together with those on financing and capacity building; the central issue in the dramatic plenary debate on Saturday was whether industrialized countries would accept language proposed by India stating that actions by developed countries in this regard must be "measurable, reportable and verifiable," the same criteria that the United States and others wanted applied to mitigation actions b y developing countries.

When the European Union indicated its support for this amendment, Japan neither supported nor opposed it, and Australia and Canada stayed silent, Undersecretary Paula Dobriansky was alone in her opposition to India's proposal. Even Saudi Arabia, normally a staunch US ally in these negotiations, took the floor to state their support for the Indian language. It was this utter isolation, in full view of civil society and the world's media, which led the United States to reverse field and accept the consensus on the floor.

Development of concrete new initiatives on cooperative research and development of climate-friendly technologies, on "effective mechanisms and enhanced means for the removal of obstacles to, and provision of financial and other incentives for, scaling up of the development and transfer of technology to developing country Parties," and on "ways to accelerate deployment, diffusion and transfer of affordable environmentally sound technologies" will be at the heart of negotiations over the next two years.

Finance

A report prepared by the UNFCCC Secretariat[2] estimates that "globally, $200–210 billion investment and financial flows from all sources (private and public, domestic and international) will be needed in 2030 to bring greenhouse gas (GHG) emissions back to the current level. About USD 65 billion of this total will be needed in the developing countries. The investment involves the energy, industry, building, waste, agriculture and forestry sectors." Obviously, greater flows would be needed to facilitate absolute global emissions reductions over this same timeframe, as would clearly be necessary to achieve the 50 percent reduction in global emissions referred to earlier.

The report notes that while investment flows of this magnitude "are large compared with the funding currently available under the Convention and its Kyoto Protocol," they are "small in relation to their share in estimated global gross domestic product (0.3–0.5 per cent) and global investment (1.1–1.7 per cent) in 2030."

The Bali Action Plan calls for "enhanced action on the provision of financial resources and investment to support action on mitigation and adaptation and technology cooperation," including "new and additional resources" from developed countries, "positive incentives for developing country Parties for the enhanced implementation of national mitigation strategies," and "mobilization of public- and private-sector funding and investment, including facilitation of carbon-friendly investment choices." These could include efforts to link sectoral, policy-based and other mitigation commitments by developing countries to the growing carbon markets in industrialized countries, reform of lending practices at the World Bank and other multilateral development banks, and ways to leverage private sector investments in climate-friendly technology.

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[2] "Review of the experience of international funds, multilateral financial institutions and other sources of funding relevant to the current and future investment and financial needs of developing countries," November 2007, available at http://unfccc.int/resource/docs/2007/tp/04.pdf

Deforestation

The inclusion of reducing emissions from deforestation and forest degradation (or REDD) in the Bali Roadmap was a major accomplishment. REDD accounts for an estimated 20% of global carbon dioxide emissions – as much as the total emissions of the United States or China, and more than those from every car, truck, ship, plane and train on planet Earth. The Kyoto Protocol did not address reductions in emissions from deforestation, allowing credits only for tree planting, not for protecting existing forests. Now, the world has decided that the new post-2012 agreement will include the quantitatively much more important -- though politically more complicated -- work of protecting tropical forests as well.

It is fitting that Indonesia -- the world's fourth largest emitter of greenhouse gases, more than 80% from deforestation -- was the setting for this breakthrough. There is a broadly shared understanding that REDD can contribute greatly needed reductions in emissions at a relatively low cost. UCS analyses[3] indicate that stopping tropical deforestation would provide 6-14% of the total reductions in heat-trapping emissions that are needed by mid-century to keep global average temperatures from rising more than 2 degrees Celsius (3.6 F) above pre-industrial levels. But a central tenet of inclusion of REDD in the post-2012 agreement is that developed countries must commit to emission reduction targets that are sufficiently deep to ensure needed reductions in both deforestation and energy and industrial sector emissions.

There's much work to do over the next two years in negotiations over this issue. Several parts of the Bali text on REDD are either disappointingly vague on details or conversely, introduce extraneous elements for consideration that distract attention from the key components. The discussion of funding mechanisms, for example, speaks only of "policy approaches and positive incentives," though nearly everyone understands that inclusion of the carbon market as a fundamental element of the final agreement is essential, to have a realistic chance of providing the many billions of dollars annually that it'll take to halt deforestation. Forest degradation -- activities like selective logging or understory fires that release carbon dioxide without destroying the forest canopy -- is included in the decision, but the technical problems of monitoring it accurately are more challenging than those for deforestation, which removes the canopy and thus can be seen easily on satellite images. The inclusion in the text of "conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries" are all laudable goals, but pose different problems from reducing emissions from deforestation, and will make the next two years of negotiations considerably more complicated.

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[3] "REDD and Avoiding Dangerous Climate Change: Science and Policy Options for the U.S.," presentation of Dr. Peter Frumhoff, UCS Director of Science and Policy, at the Kathryn Fuller Science for Nature Fund 2007 Science for Nature Symposium, October 18, 2007. Available at www.worldwildlife.org/fellowships/2007pdfs/session2-FrumhoffREDDWWF10-18-2007final.pdf

Still, this shouldn't detract from the fact that the issue of preserving tropical forests is now part of the negotiations over the post-2012 treaty regime. This will be remembered as one of the major achievements of the Bali COP.

The Road from Bali

As important as the substance of the Bali Action Plan is its commitment to an intensive two-year set of negotiations aimed at producing agreement on a comprehensive new post-2012 climate treaty regime by the late 2009 15th Conference of the Parties meeting in Copenhagen. Parties agreed to conduct four negotiating sessions a year, up from the current two, and to conduct a mid-course review of progress made at the 14th Conference of the Parties meeting next December in Poznan, Poland.

The job of integrating the outputs of the two negotiating tracks (the Ad Hoc Working Group on Long-Term Cooperative Action under the Convention, and the Ad Hoc Working Group on Further Commitments for Annex 1 Parties under the Kyoto Protocol), is complicated by the fact the largest industrial emitter, the United States, is not a Kyoto party. The clear hope of other countries at the Bali negotiations is that the next U.S. president will be committed to re-engaging the United States fully in the multilateral climate treaty process, and to taking the actions needed to get U.S. greenhouse gas emissions on a downward trend commensurate with that actions of Europe, Japan, and other industrialized nations. If that proves to be the case, the job of deciding whether the post-2012 regime involves amending the Kyoto Protocol, amending the Framework Convention, or creating a new instrument under the Convention will be made easier.

The fact that at the end of the day, the current U.S. administration was unwilling to block negotiations over quantified emission limitation and reduction obligations for the United States and other industrialized countries, together with more aggressive mitigation actions by developing countries, should be seen as a hopeful sign. For while a different U.S. team will be on the field during the second half of the negotiations in 2009, it would be a tragic waste of valuable time if the U.S. strategy for the next year were to be to simply run out the clock.

With the United States stepping back from the brink of blocking the Bali Action Plan last Saturday, the European Union and other countries have signaled a willingness to participate in the next meeting of the U.S. Major Economies process that was launched last September in Washington. The next meetings of that process are scheduled for late January in Honolulu and February in Paris. What the focus of those meetings should be, and how to avoid meeting overload for the countries involved not only in that process, but in the meetings leading up to the July G-8 summit in Hokkaido, Japan as well as the intensified round of negotiations launched in Bali, are important issues that remain to be addressed.

In her speech during the high-level segment, Connie Hedegaard, Minister for Climate and Energy of Denmark – the country that will host the 15th meeting of the Conference of the Parties in December 2009 where the new agreement will hopefully be reached – laid out a clear challenge to those of us here in the United States:

> It is about time that we act – in a collective, constructive and timely manner. For almost a century, Europe has looked to the United States for leadership and guidance in times of instability and change.
>
> We do so yet again, as we strive to reach a truly comprehensive agreement to combat climate change. But we do so, knowing full well that all countries – not least the largest emitters – share responsibility for the final outcome.

Let us heed her wise words as we move forward from Bali to Copenhagen.

The CHAIRMAN. Thank you, Mr. Meyer, very much.

Our second witness is Mr. Phil Clapp, who is the deputy managing director of the Pew Environmental Group. Mr. Clapp previously served as the president of the National Environmental Trust, which he led since its founding in 1994. Mr. Clapp has more than a decade of experience on Capitol Hill, as staff director of the House Budget Committee's Energy and Environment Task Force and legislative director for former Senator Tim Wirth.

We welcome you, Mr. Clapp. Whenever you are ready, please begin.

STATEMENT OF PHILIP CLAPP

Mr. CLAPP. Thank you, Mr. Chairman. And thank you for your invitation to be here today.

First of all, I want to congratulate you on what has just occurred. The President has just signed the energy bill, and that culminates what I know is for you a 20-year crusade to increase the fuel economy standards in Federal law. And you have contributed an enormous amount to that all the way back to 1982, and I remember your efforts back on the Energy and Commerce Committee at that time. So, congratulations.

The delegates came to Bali with fundamentally three challenges: first, a decision as to whether to launch formal negotiations on a new treaty to be concluded in Copenhagen in 2009; secondly, to establish the timetable and rules for those negotiations; and third, to agree upon measures that would be open for discussion.

That was the minimum bar, and I think all three were accomplished in Bali. We have an agreement today that could have launched a much stronger set of negotiations. As many of you have noted in your opening statements, the European Union proposed a reduction of 20 to 40 percent in worldwide emissions and a long-term goal of a 50 percent reduction by 2050.

I want to emphasize that those were only in the preamble of the agreement. This was an ultimately hortatory statement that this is the target that the world should be seeking to reach in the new negotiations. No one was attempting in Bali to impose some sort of regulatory straightjacket that said there was a binding agreement that these reductions should occur. But it was an attempt to create a budget.

Unfortunately, the United States opposed those provisions, that preambular language. And, as a result, although it does appear in the text, we can claim less of an endorsement coming out of Bali for that as a target than we could have. And that is unfortunate, given how quickly the scientific evidence is mounting.

I mean, we are now at the point where Arctic Sea ice was reduced to less than half of its normal size this year. The Northwest Passage opened for the first time in history this year. And we have scientists telling us very clearly, most recently at the American Geophysical Union meeting that was held in San Francisco concurrent with the Bali talks, that we will reach the point when the Arctic may be free of summer sea ice not by 2040, a projection which shocked scientists when one NASA scientist made it last year, but as early as 2012. The leading scientist who made that projection, who actually is the son of a coal miner and worked in coal mines as a child, said, “The canary has died. It is time to get out of the mine.” That is the urgency of these talks. The world has one more shot to get an agreement, and this will be it.

There is enormous suspicion of the United States throughout these talks, and it does not come just from President Bush’s opposition to a binding international treaty and numerical targets. The United States, all the way back to 1992, has a long history of either fighting binding agreements, as it did with the framework convention under the first President Bush—that convention is voluntarily only because of U.S. opposition—through Kyoto in 1997, when the United States, under the Clinton administration, sought weaker targets and, indeed, did not act to reduce its own emissions.

So we have an enormous challenge to lead. And Kevin Conrad of Papua New Guinea said it best at the end when he said, “Lead, follow or get out of the way. We would like to see you lead. But if you will not lead, get out of the way.” The United States has to lead these talks. There is enormous suspicion of U.S. intentions under an administration of either party. And unless we do not take up our responsibilities, we will see another treaty that fails.

I want to make one more comment about the role of developing nations, which Ms. Figueres will go into, I am sure, in much more detail. The watershed at these talks was that developing nations came to the table and the United States found itself incapable of saying yes to their proposals. For the first time, developing countries, including China, agreed to undertake measurable, reportable and verifiable emissions reductions actions. That is a step across a line that was first drawn in 1992.

In addition, although I was complimenting the Chairman on the bill that the President signed today, I would like to point out that China, for example, has fuel economy standards in place today that met the same target in that bill, which is 2018, in 2005. So there is an enormous amount of leadership going on in the developed world that the United States is not recognizing. And unless we do and come to the table with something to offer in return for their leadership on a number of these issues, we will find yet another failed negotiation.

[The statement of Mr. Clapp follows:]

THE
PEW
CHARITABLE TRUSTS

Statement

of

Philip Clapp
Deputy Managing Director
Pew Environment Group

on the

Decisions of the 13th Conference of the Parties
to the
United Nations Framework Convention on Climate Change
Bali, Indonesia, December 3-15, 2007

before the

Select Committee on Energy and Global Warming
United States House of Representatives

December 19, 2007

Good morning, Mr. Chairman and members of the Committee. I am Philip Clapp, deputy managing director of the Pew Environment Group, the conservation arm of The Pew Charitable Trusts.

With a staff of more than 80 scientists, attorneys, economists, policy experts and communications professionals, the Pew Environment Group operates programs throughout the United States, as well as in Canada, the European Union, Australia, New Zealand, the western Pacific and the Indian Ocean. The Environment Group works to advance the frontiers of scientific understanding of the causes and consequences of environmental problems; to design innovative policy solutions to these problems; and to mobilize public support for implementing these solutions. Our efforts are focused on reducing the scope and severity of three major global environmental problems:

- *Dramatic changes to the Earth's climate caused by the increasing concentration of greenhouse gases in the planet's atmosphere;*
- *The erosion of large wilderness ecosystems that contain a great part of the world's remaining biodiversity; and*
- *The destruction of the world's oceans, with a particular emphasis on global marine fisheries.*

Global warming has been a principal focus of the Trusts' environment program since 1990.

I appreciate the Chairman's invitation to appear before the Committee to comment upon the Decisions of the 13th Conference of the Parties to the United Nations Framework Convention on Climate Change, which was held in Bali, Indonesia, from December 3 through last Saturday, December 15.

It is important to note at the outset that the Conference of the Parties to the Framework Convention sat concurrently as the 2nd Meeting of the Parties to the Kyoto Protocol, which is an implementation agreement of the Convention. Having ratified the Framework Convention on September 8, 1992, the United States is a full party to that treaty. Its concurrence is required for decisions to be adopted by conferences of the parties, which proceed by consensus, not by majority vote. When matters specific to the Kyoto Protocol are under discussion, the United States may participate as an observer, but its concurrence in decisions is not required since it has signed but not ratified the agreement.

The representatives of 188 nations who assembled in Bali faced three challenges:

1) to decide whether to launch formal negotiations on a new international global warming agreement to take effect when the emissions reductions commitments for developed countries negotiated at Kyoto a decade ago expire in 2012;

2) to establish a timetable for completion of a new treaty and the rules under which it will be negotiated; and

3) to agree upon the measures open for discussion in the negotiations.

There have been a number of inaccurate reports in the media that may have left many with the impression that actual emissions reduction targets to be applied to individual nations were under discussion in Bali. We are a long way from that stage in crafting a new international agreement. The Bali conference was a preliminary but critical negotiation about the kinds of measures nations were willing to consider for inclusion in a new treaty and the rules and timetable for the discussion. It was not about delineating individual national emissions reduction targets.

A New Treaty: How Committed is the U.S.?

When delegates arrived in Bali, there was already an international consensus on the first issue – launching formal negotiations on a new treaty. However, many nations questioned the United States' commitment to serious negotiations.

The world has negotiated two previous global warming agreements: the Framework Convention in 1992 and the Kyoto Protocol in 1997. The Framework Convention, which, at U.S. insistence, carried no international penalties for any nation's refusal to implement its commitments, has been a manifest failure. Under that agreement, the United States committed to reduce its greenhouse gas emissions to 1990 levels by 2000 and submitted a national plan for meeting the commitment, but failed to implement the domestic measures necessary to even halt the growth of its emissions. In 2000, U.S. emissions were 13 percent above their 1990 levels, and we were – and continue to be – in violation of our ratified treaty commitments. Other nations pursued the same business-as-usual course as well.

By 1995, the failure of the Framework Convention was apparent, and nations agreed in Berlin in July of that year, at a conference similar to that held in Bali over the last two weeks, to decide whether to launch negotiations on an implementation agreement that would include international penalties for failure to comply with its provisions. The resulting Berlin Mandate set a two-and-a-half year negotiating timetable, scheduling adoption of an implementation agreement for Kyoto in December of 1997. The United States' failure to ratify the Protocol produced a lengthy delay; the agreement came into force only in 2005.

With only two years of implementation behind us, it is far too early to label the agreement either a success or a failure. It is not too soon to assess whether it is an improvement on the voluntary Framework Convention, however: the Kyoto Protocol is generating action by the governments of developed nations and by businesses to attempt to reduce their emissions for the first time. The European Union has established a carbon trading system and individual European nations have launched aggressive renewable energy and energy efficiency programs, to cite only one example. The Clean Development Mechanism, established under the Protocol to channel investment into more sustainable energy infrastructure in developing countries is generating 1.9 billion euros per year in emissions credits generated from business investment in developing countries. The Kyoto Protocol was never intended to be the final solution to the problem of global warming. Its emissions reduction targets were modest – 5% below 1990 levels – and its participation limited to 37 developed nations. It was intended to get the world started on building the market infrastructure necessary for a large shift in the world's energy economy, and that work is being done.

The expiration of the Protocol's original targets at the end of 2012 threatens even this small progress. Without a new round of negotiated reductions, the fragile new carbon markets will come to an end, as will the small beginnings of the shift in business investment away from fossil energy world-wide.

Equally important, scientists' understanding of the sensitivity of the climate system to greenhouse gases has advanced rapidly in the past five years, culminating in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change this year. The Fourth Assessment conclusively shows that many of the projections of the 1990's were wrong: they were far too conservative. The impacts of global warming are being felt far more quickly than most scientists would have believed 10 years ago. The massive reduction in levels of Arctic sea ice, reducing what the layman thinks of as the North Pole to one half its size and opening the Northwest Passage to shipping for the first time in history, is only one of hundreds of observed phenomena indicating that we have drastically underestimated the speed with which rising greenhouse gas concentrations are undermining the world's climate system. Dr. Marika Holland and a team of scientists led by the National Center for Atmospheric Research shocked their colleagues in 2006 when they estimated from satellite observation that the Arctic would be ice-free in summer by 2040. During the American Geophysical Union conference held in San Francisco at the same time as the Bali talks, Dr. Wieslaw Maslowski revised his projection based on 2007 data. It is possible, he projects, that the Arctic will be ice-free in summer only five years from now, as early as 2012.

A majority of the nations represented at Bali believed that negotiations on a new treaty should be launched as much as two years ago. However, the United States appeared to be an obstacle to that effort because of the Administration's strong opposition to including binding emissions reductions in a new treaty. At the 11th Conference of the Parties, in Montreal in December of 2005, a walkout by the senior U.S. negotiator opposing any consideration of binding targets in new talks nearly scuttled the decision to hold the Bali conference in the first place. Only after it became clear that the United States would be publicly blamed for the collapse of the 11th Conference talks did the U.S. delegation return to the table.

As late as last spring, when German Chancellor Angela Merkel circulated her first draft text of a proposed global warming agreement for the 2007 G8 Summit, U.S. negotiators raised vociferous objections to virtually all her proposals. Among them were negotiation of a strong new international treaty which would hold global temperature increases below 2 degrees Celsius, beyond which scientists believe that catastrophic impacts are likely from atmospheric warming; a 20 percent improvement in the energy efficiency of each G8 economy by 2020; and a 30 percent increase in the energy efficiency of each nation's utility sector by 2020. Then-Prime Minister Abe of Japan added his own proposal that the G8 leaders adopt a 50 percent reduction in greenhouse as emissions by 2050 as a formal goal for the new treaty. U.S. opposition watered the final G8 communiqué down to a weak endorsement of achieving a new international agreement under the U.N. process by 2009, and a willingness "to seriously consider" a 50 percent emissions reduction by 2050 as a long-term goal. The President's enthusiasm for achieving a new international agreement within the United Nations framework was further called into question by his launch of a parallel set of discussions among major emitting nations, the first meeting of which occurred in Washington in September, discussed below.

Most nations came to Bali highly suspicious of public statements by the United States that it was committed to launching formal negotiations on a new agreement. Certainly, President Bush's long-held opposition both to binding international agreements and to setting specific targets for emissions reductions was one factor in that suspicion. But it is important to recognize that the United States has a 15-year history of making and breaking treaty commitments on global warming, of refusing to embrace or watering down strong emissions reduction goals, and above all of failing to act to reduce its emissions at home while lecturing the rest of the world on the need to do so. The next two years of negotiations will be strongly colored by that history, and the next president must make building trust among our negotiating partners, particularly in the developing world, a cornerstone of his or her approach to these negotiations.

Two Negotiating Tracks or Three?

The United States and the rest of the world continue to be fundamentally at odds over whether the next global warming agreement should include binding numerical commitments for emissions reductions. Other nations long ago concluded that voluntary international agreements had failed and that binding agreements were the only measures that at least had a prospect of spurring action.

The United States and the European Union both came to Bali armed with proposals for one, unified set of talks. The United States envisioned a single – or at least dominant – set of talks under the Framework Convention focused on the formulation of individual national emissions reduction plans under the umbrella of a long-term emissions reduction goal, but without any international enforcement mechanism or shorter term targets or carbon trading system. The European Union envisioned a broad negotiation that could include binding targets. Both sides were aware from the beginning that neither of these options would win approval.

In the end, the inevitable compromise is complicated but necessary. Negotiations will proceed both under the Framework Convention, where the Administration may discuss its voluntary approach, and under the Kyoto Protocol, where the Administration cannot block discussion of binding targets. This situation has existed for two years already, and will persist until President Bush leaves office. It was agreed to simply out of the necessity to begin talks now rather than wait until 2009, when a new administration takes the helm.

The larger question is whether there is to be a third negotiating track, at odds with the two under the United Nations process. In response to Chancellor Merkel's proposals at the 2007 G8 Summit, President Bush launched a separate set of talks among the world's 17 largest emitting nations. The first meeting last September concentrated largely on agenda and process. On the first day of the Bali conference, however, the chairman of the White House Council on Environmental Quality circulated to the delegations of all 17 nations a detailed agenda and schedule for the "major emitters" discussions. The agenda includes monthly meetings through June, 2008, with the first scheduled for January 31 in Hawaii.

The Administration's intentions in these talks continue to be unclear. The U.N. process has now been structured to allow President Bush's negotiators to discuss any combination of proposals with any other set of nations. Why the major emitters process continues to be necessary is unclear. More important, the parallel nature of the process is profoundly disturbing. Each nation has only so many global warming negotiators. A series of monthly meetings scattered around the globe in the major emitters process will seriously undermine the ability of governments to carry forward discussions under the Bali Action Plan just adopted. The Administration needs to make clear the relationship between the two and what it anticipates to achieve in its proposed process. Agreeing to a long-term global goal for emissions reductions, which seems to be the only clear objective outlined so far, would not require monthly meetings through June. As a matter of fact, it could probably have been agreed to in Bali, where there seemed to be a consensus around Prime Minister Abe's original 50-percent-by-2050 proposal, or something somewhat stronger.

U.S. and Developing Country Responsibilities

Both the Framework Convention and the Berlin Mandate of 1995 recognized that developed nations had generated the vast majority of greenhouse gases accumulated in the atmosphere.

Europe (32%) and the United States (29%), which began coal- and oil-fired industrialization in the 19th century, are responsible for over 60% of today's manmade greenhouse gas concentrations. Japan, Russia, Canada and Australia industrialized next, largely in the 20th century, and have together contributed approximately 15% of today's concentrations. China (8.1%) and India (2.5%), whose industrial development dates from the late decades of the 20th century, generated only a little over 10% of today's concentrations. Collectively, all other countries – more than 175 nations -- are responsible for only 13% of increased concentrations since the 1750's.

The United States acknowledged this responsibility in ratifying the Framework Convention under the first President Bush and in agreeing to the Berlin Mandate under President Clinton. Both agreements enshrined the principal that developed and developing nations bore "common but differentiated responsibilities" for reducing future greenhouse gas emissions. The Berlin Mandate and the Kyoto Protocol defined these differentiated responsibilities to mean that developed nations should take the first steps to reduce their emissions, with developing countries following later.

The United States and developing countries agree that this relationship needs to achieve a different balance in a new international treaty. The United States believes – and this extends beyond the Bush Administration to many in Congress – that at least large developing countries experiencing rapid economic growth must demonstrate a willingness to reduce their own emissions. Developing countries, on the other hand, have been loath to enter into those discussions until the United States demonstrates at least some willingness to live up to 15 years of promises about reducing its own emissions.

The watershed in Bali was that developing countries came to the table willing to discuss emissions reductions of their own for the first time. The Bali Action Plan opens discussion on "measurable, verifiable and reportable" emissions reduction actions that may be undertaken by developing countries.

For China, in particular, this is a critical first step. China has never before been willing to consider emissions reduction measures reportable to an international body. In addition, verifiable emissions reduction measures are a threshold requirement for China eventually to receive credit for emissions reductions measures in world carbon markets.

Rainforest nations, too, were willing to discuss quantifiable emissions reduction measures. They proposed negotiations on how emissions reductions achieved through policies to fight deforestation might qualify for market credits. Ironically, it was the United States, the country that invented the cap-and-trade, market-based approach to emissions reductions and foisted it upon the rest of the world at Kyoto, that blocked this proposal. The Administration, opposed to binding targets and cap-and-trade emission reduction systems, could not permit talks to proceed on this basis.

It was the debate over the relative obligations of the United States and developing nations – and I intentionally say the United States, not "developed countries" – that led to the dramatic and embarrassing conclusion of the plenary session last Saturday.

The United States came to Bali fundamentally with nothing to offer anyone, but demanding a great deal from developed countries. Administration negotiators put no proposals on the table about what the United States would commit to in reducing its own emissions; with numerical targets and binding reductions off the table, there was little to say. The President has made a great deal of the necessity to transfer technology to developing countries to assist in reducing their emissions; this is one of the foundations of the Asia Pacific Partnership the White House launched in 2005. But when proposals were advanced to tie developing country emissions reductions to the scale and effectiveness of technology transfer and financing assistance, the Administration delivered a firm and consistent, "No."

In the end, the U.S. delegation badly misjudged the depth of anger and hostility it had generated among developing countries in Bali and other settings. In the final session, India proposed that the same language that had been applied to developing country emissions reduction actions under a new treaty – "measurable, verifiable and reportable" – be applied to developed countries' technology transfer and financial assistance obligations. The United States, confident that at least one of its shifting group of allies would join its position, objected. To the U.S. delegation's undoubted surprise, every nation that rose to speak opposed the U.S. position. Canada and Russia, sometimes allies in these talks, were silent. Japan's statement was equivocal. Even Saudi Arabia, strongly opposed to any further talks on greenhouse gas emissions reductions at all and usually a Bush Administration ally, supported the Indian proposal. Developing country after developing country rose in an increasingly strong wave of anger at the U.S. position. Faced with the prospect of being accused of collapsing the talks, the U.S. delegation reversed its position and accepted India's proposal.

It was a deeply embarrassing moment for any American in the hall. In a decade of attending global warming negotiations, I have never seen the United States so thoroughly isolated, nor have I seen such a cauldron of hostility boil over at any nation.

Contrary to the statement released by White House Press Secretary Dana Perino within hours of the talks' completion last weekend – a statement in which the Administration came very close to disavowing the entire Bali agreement – developing countries demonstrated a willingness to get serious about reducing their own emissions. In fact, they invited the United States to begin those discussions. In the end, the United States found itself unable even to say, "Yes."

This is a critical issue as we move forward in these negotiations. There is already quite a visible tendency within the Congress to try to sound tougher and tougher on China on just about any issue. Indeed, China's emissions will soon be equal to those of the United States, but the two nations are not equal economically: 57% of China's population still lives on $5 a day. Having failed to restrain its own emissions growth, the United States has no standing to lecture China on its emissions. A negotiation with China will have to be a real negotiation in which the United States has something to offer for what we want in return.

The Bali conference launched formal negotiations on a new international global warming agreement and set a firm deadline of December, 2009, when the 15th Conference of the Parties will meet in Copenhagen, Denmark, for its adoption. We have a very short two years to shape a much more complex agreement than the Kyoto Protocol. I encourage the members of this committee to become more deeply engaged in the talks as they proceed. Domestic global warming legislation the House considers in the next Congress will directly affect and be directly affected by how these talks are proceeding, and domestic action and an international agreement must go hand-in-hand.

Again, thank you for inviting me to testify.

The CHAIRMAN. Thank you, Mr. Clapp, very much.

And thank you for your kind words about the energy bill. I might add that we have now finished the energy bill. The President has signed it. I don't think anyone was predicting that last December, but it has happened.

And what we are doing here in this December, on this day, on this afternoon, is having the last hearing that this Congress will have, but it is really the first hearing of the next Congress. There are a lot of people who do not believe that we can pass a cap, auction and trade bill as well. But the Speaker is committed to it. And that is why we are having this hearing today. Think of it as the first hearing on the next big issue that we hope that we can get the President's signature on.

Our next witness, Christiana Figueres, has been official negotiator of the U.N. Framework Convention on Climate Change and the Kyoto Protocol for Costa Rica since 1995. She also serves as a member of the executive board of the Kyoto Protocol's Clean Development Mechanism. In 1995, Ms. Figueres founded the Center for Sustainable Development in the Americas, where she served as director until 2003. For her leadership in the areas of climate, energy and conservation, National Geographic and Ford Motor Company recognized her with their Hero of the Planet Award in 2001. We are extremely fortunate to have her expertise on Costa Rica and developing nations.

Welcome, Ms. Figueres. Whenever you are ready, please begin.

STATEMENT OF CHRISTIANA FIGUERES

Ms. FIGUERES. Thank you, Mr. Chairman, Honorable Members.

I speak to you as a citizen of Costa Rica, a developing country that has taken on the goal of being carbon-neutral by the year 2021. We do so in full recognition that our impressive size will not necessarily affect global trajectories of emissions, but out of the deep conviction that it is the moral obligation of every country, large or small, to do the utmost to address climate change.

You have asked me to come here today to address the issue of the Bali meetings from the perspective of the developing countries. As already pointed out by speakers before me, this meeting will be recognized as the one meeting in which developing countries made a landmark stride forward.

I want to point out three specific issues that are highly unusual for developing countries.

Number one, their willingness to participate in the climate change convention in very unusual ways. Developing countries are already and have already done more than the sum total of countries participating in the Kyoto Protocol, and I believe Ned will give you the numbers of that. However, in Bali, they expressed their very clear intent to do more than that. In a dramatic departure from the traditional no-new-commitments stand, developing countries assumed, under the Bali decision, their willingness to undertake measurable, verifiable and reportable actions supported by finance and technology on the part of developed countries.

The industrialized countries assume measurable, verifiable and reportable commitments or actions according to their national circumstances. From our perspective, we recognize that this is a major step forward for the United States, given where the United States has been over the last few years. But it is a much weaker commitment than that which the European Union had already committed to before they went to Bali. So on that score, the developing countries have put much on the table, and, as a group, the industrialized countries have put comparatively less.

To my second point, commitments, our very favorite word. The decision in Bali does not obligate any party to any type of commitment. In fact, it just opens a process over which, over the next 2 years, we will explore the form and level of commitment of all parties.

The form of further contributions on the part of developing countries is yet to be determined, but it will very likely not be binding national emission targets as those that are assumed under the Kyoto Protocol. In fact, it is our task over the next 2 years to explore the full range of commitment types that may be possible and possibly to move toward a basket of commitment types where every country will assume the type of commitment that it feels comfortable with according to its national circumstances.

Third, and most importantly, contingency. The Bali discussions point very clearly to the fact that all further action of the developing countries is predicated on whatever the industrialized countries are going to do and, more specifically, on what the United States is going to do.

The United States is admittedly the largest historical emitter, the highest per-capita emitter and the wealthiest nation. It is understandable, then, that there is a perception that the United States is not doing enough.

I would like to underline that a higher level of ambition of the United States as we go forward will encourage stronger contributions of the developing countries. Conversely, a lower level of ambition of the United States will elicit only weaker contributions of the developing countries. Hence, the United States is in the very privileged position of wielding the most influence on what the global overall level of effort is going to be, as we move forward.

To conclude, I would like to underscore that this new engagement of developing countries is a very clear invitation to the U.S. to engage. But there is a timing issue here. The agreement is scheduled to be reached by the end of 2009. Given where the United States is in its electoral cycle, it is more than likely that the U.S. participation in this regime will be shaped by this Congress. Hence, we are very encouraged by the development of mandatory legislation to reduce emissions in the United States.

Honorable Members, it is in your hands to ensure that we, together, live up to the science of what is needed and stay within the art of what is possible. Thank you.

[The statement of Ms. Figueres follows:]

December 19, 2007

Testimony of Christiana Figueres
Before the Select Committee on Energy Independence and Global Warming
U.S. House of Representatives
Rayburn House Office Building
Washington D.C.

Honorable Members of the Select Committee,

I speak to you as a citizen of Costa Rica, a country that has set a goal to be carbon neutral by 2021, the 200th anniversary of our Independence. While we understand that meeting this goal would not substantially affect global emission trajectories, it is our firm belief that it is the moral obligation of every country, small or large, to do its outmost to address global climate change. I have had the honor of negotiating the UNFCCC and the Kyoto Protocol on behalf of Costa Rica since 1994, and I currently represent Latin America and the Caribbean on the Executive Board of the Clean Development Mechanism.

You have asked me to address the Bali meeting from the perspective of developing countries. One of the toughest negotiation rounds of the Climate Convention, I venture to predict that the Bali meeting will be recognized as the first step of a remarkable turning point in the participation of developing countries in the global climate regime. It is now clear that developing countries have not only already achieved major emission reductions, but that they are willing to undertake further action. The form of developing countries' further contributions still needs to be defined, but in any case they are not likely to be binding economy-wide emissions targets. Considering their lesser cumulative emissions, lower GHG emissions per capita, and much lower GDP per capita, developing countries are interested in exploring a range of commitment types, where each country could assume the type and level most appropriate to its circumstances. Finally, this further action of developing countries is clearly predicated on the leadership of industrialized countries as a group, and specifically on the role of the United States, the largest historic emitter.

The Bali meeting delivered concrete results with respect to at least three key topics, all of which are central to developing countries:

1- **Avoided deforestation.** The current climate regime does not allow developing countries to claim credit for reducing their deforestation rates, despite the fact that deforestation accounts for over 20% of global carbon emissions. In preparation for a new regime post 2012, the Bali meeting took a decision that will encourage tropical forest countries to initiate pilot activities that will develop national emission baselines, based on historic emissions, in order to measure emission reductions into the future. Left open is the question of how these reductions will be financed, as this will be discussed over the next two years in the framework of the design of the future regime.

2- **Adaptation.** The existing global climate regime practically ignores the importance of adaptation to the inevitable adverse impacts of climate change. In countries like the United States, a genuine concern about climate change would mean smarter but continued growth. By contrast, for Small Island States and low lying least developed countries the rise of sea level and the increase in hurricane power are issues of survival. The decision taken in Bali is the first global recognition of the urgent need for adaptation measures, technology and funding. Industrialized countries may have finally recognized that it is better to invest in adaptation now, than deal with massive waves of climate immigrants in the future.

3- **Mitigation.** The short section on mitigation which lays the groundwork for the next two years of negotiations was the most controversial text of the entire meeting. It was clear from the beginning that this framework needed to be flexible enough to allow the U.S. the maneuverability that it needs as it transitions from one administration to the next, while being robust enough to win the engagement of major developing countries. The balance was carefully crafted along two main lines:

a- **Level of effort with respect to a global goal.** The recently released Fourth Assessment Report of the IPCC calls for global emissions to peak in 10 to 15 years and decline “well below half” of 2000 levels by 2050, and for developed country emissions to be 25-40% below 1990 levels by 2020. Developing countries and the European Union were adamant on including these numbers as a backdrop for future reduction efforts. While agreeing with the 2050 goal, the United States steadfastly opposed the 2020 numbers, which are far more aggressive than the target levels being considered by any of the legislative options in the US Congress. The final compromise contains no numbers and simply calls for “deep cuts in global emissions” with a footnote referring to the IPCC’s Report.

b- **Nature and source of contributions.** Although the U.S. arrived in Bali with a willingness to consider concrete future mitigation actions, it was clear that these were intended to be achieved at the national level, with no international commitments, and with no substantial differentiation between industrialized and developing countries. This approach runs contrary to the very essence of the UNFCCC which is built on the principle of “common but differentiated responsibilities and respective capabilities”, and which clearly distinguishes between industrialized and developing countries, due to both their different historic responsibilities and contrasting economic development levels. Other than the U.S., all countries were resolute on retaining the structure of the UNFCCC. Furthermore, developing countries made it clear that, in addition to what they have already achieved in the way of emission reductions, they are willing to do more, but that the nature and level of their contributions is directly dependent on the nature of the efforts of industrialized countries, in particular those of the U.S., being the only major industrialized country that remains outside the Kyoto Protocol. A higher level of ambition on the part of the US encourage a correspondingly higher level of contribution (albeit in a differentiated manner) from developing countries. A weaker commitment on the part of the US elicits a correspondingly weaker contribution from developing countries. (See attached table.)

In the final compromise, developing countries, in a major departure from their traditional “no new commitments” stand, took a critical step forward by agreeing for the first time in the history of the climate regime to “measurable, reportable and verifiable mitigation actions”, supported by “measurable, reportable and verifiable” technology and finance from developed countries. Industrialized countries will consider taking “measurable, reportable and verifiable mitigation commitments or actions”, which could include but is not limited to, emission targets. This is a major step with respect to the position of the United States over the last twelve months, but for the E.U. a much weaker commitment than the unilateral announcement they had already made prior to Bali.

While the decision to launch a new negotiation process is a watershed decision, it is not a mandate in the sense of the 1995 Berlin Mandate, which instructed all industrialized countries to set legally binding "quantified limitation and reduction objectives" and which resulted in the Kyoto Protocol. The Bali text binds no party to any particular outcome; it allows the next two years of deliberations to decide on both the form and the level of any future commitments, in recognition of the fact that there is a wide variety of potential mitigation commitment types that countries could take. In this sense, one of the major tasks of the upcoming process is to explore the broad meaning of the concept of "commitments". Future mitigation commitments are likely to abandon the simplicity of exclusively setting fixed targets and move in the direction of a basket of commitment types, where each country could assume the type and level most appropriate to its circumstances.

The launch of a new negotiation cannot to be seen in isolation but rather in the context of the other post 2012 efforts. The Ad hoc Working Group on Further Commitments (AWG), which focuses on increasing the emission reduction commitments of countries that participate in the Kyoto Protocol, defined 2009 as the deadline for adopting new commitments under the Protocol, and over the next two years will focus on the scale of the intended emission reductions, together with the means to implement them and the consequences of doing so. Countries also set the parameters for the required review of the Kyoto Protocol: progress by industrialized countries in implementing their financial and technology commitments, and the adequacy of the flexibility mechanisms (emissions trading, Clean Development Mechanism, and joint implementation).

Taken as a package, under the umbrella name of the "Bali Roadmap", these efforts represent an unprecedented opportunity to rethink the structure, the logic and the potential of the global climate regime. It is evident that the design of the new regime will not be as simple as the design of the Kyoto Protocol, which simply differentiates industrialized from developing nations. There is obvious differentiation with respect to responsibility[1], capability[2], and potential to mitigate[3], not only between the industrialized and the developing countries, but also among developing countries. The vast majority of developing countries do not contribute substantially to growing global emission levels, but are instead the major victims of the adverse effects. There are only a few large developing countries that actually do have an impact on emissions, and they must be brought on board. However, China and India alone have already voluntarily reduced more emissions than those achieved by the group of countries participating in the Kyoto Protocol. China, Brazil, Mexico and South Africa are vocal in their commitment to do more. China has announced its Climate Change Plan which includes an intended 20% improvement in energy efficiency by 2010 and more than doubling the use of renewable energy by 2020, and promises to "blaze a new path to industrialization." Mexico's Climate Change Strategy seeks to reduce 100 million tons of CO2/year with energy efficiency, renewables, and cleaner generation, plus an additional 17 million tons sequestered through land use. The process to develop the new regime must use these developing country efforts as building blocks, and will have to combine a variety of elements to produce a structure more representative of the wide diversity of potentials and capabilities of participating nations.

In this process, timing is the detonator of leadership. The new agreement is scheduled to be reached by December 2009. It appears unlikely that the outgoing U.S. administration will have a major impact on the process over the next 12 months. The new administration will realistically not be ready to engage until the spring of 2009. Thus the U.S. participation in the future global climate regime will be shaped mainly by the domestic climate change legislation to emerge from these legislative chambers. We are encouraged by the development of domestic legislation options in this country. By being the largest emitter and having been on the sidelines for such a long time, there is heightened expectation for the United States to finally assume its responsibility within the next chapter of the international regime. Ironically, the eagerness of all others to have the US on board will give the United States a position of critical influence with respect to the shape of that future international regime. It is in your hands to ensure that the regime lives up to the science of what is needed, while staying within the art of what is possible.

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[1] Measured as cumulative CO2 emissions since 1990

[2] Measured as GDP per capita

[3] Measured as GHG emissions per capita

RECIPROCITY OF CONTRIBUTIONS

	Options	Industrialized countries	Developing countries
Increasing level of ambition ↑	1	Kyoto comparable commitments among all industrialized countries (explicit reference to non ratifiers) →	Commitments to enhanced and incentivised mitigation action- measurable, reportable & verifiable
	2	Comparable national effort for all industrialized countries with international reporting (No reference to non-ratifiers) →	Enhanced and incentivised mitigation actions- measurable, reportable & verifiable
	3	Measurable and reportable national effort for all industrialized countries, without international reporting →	Enhanced implementation, incentivised mitigation actions
	4	Enhanced national mitigation action with globally shared effort that culminates in one or several international agreement(s)	

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The CHAIRMAN. Thank you very much.

And our next witness, Ned Helme, is founder and president of the Center for Clean Air Policy and has more than 25 years of experience working on climate change and air policy. Mr. Helme advises Congress, State governments and the European Commission and developing countries on those issues. He played a key role in the development of the Clean Air Act of 1990 and the European Union's emissions trading system.

So we welcome you, sir. Whenever you are ready, please begin.

STATEMENT OF NED HELME

Mr. HELME. Thank you very much, Mr. Chairman and Members. I appreciate the opportunity to speak to you today. I will kind of clean up here and I will try to cover the points that maybe weren't covered by my colleagues.

As you mentioned, we work a lot with key developing countries—China, India, Brazil and Mexico, in particular—and we work with a number of the States in the United States.

During the course of the Bali meeting, we brought together Ministers from 25 countries—Christiana was part of that meeting—and talked about the Bali road map and the idea of providing incentives for developing countries to go beyond what they have done. And I will show you in a minute a slide that shows exactly how much effort they have made. And it was endorsed by all of those present and certainly became a part of the final agreement.

We also hosted a meeting for Senator Kerry and your staff and other staffs there, with the leadership of the European Union, in a very constructive exchange on a lot of these issues.

I want to make four points this morning.

First, I want to emphasize the difference in vision between the United States and that of the European Union and developing countries and the rest of the world in this debate.

Secondly, I want to talk about the EU's leadership. I think what they did going into Bali and what they did at Bali was critical to the outcome and deserves a lot of recognition and reflects dealing with the competitiveness issue in an effective way. And I want to come back to that.

Thirdly, I want to echo what Christiana and others have said about the role of developing countries and sort of provide you with some actual detail on the level of effort developing countries have undertaken already and what we expect coming forward.

And, finally, I want to address the issue that Mr. Sensenbrenner raised earlier about competitiveness. I think the European Union has crafted a much better path, a much more positive path to dealing with that than we have so far in the U.S., where the major effort so far has been this border tax adjustments provision proposed by Mr. Bingaman and others in the Senate bill. I think there is a much better path that developing countries would welcome to move the ball forward rather than sort of saber-rattling, as we saw the administration do a bit of during the debate.

Let me hit quickly these points.

In terms of difference in vision, I think the fundamental difference here is Europe and developing countries see this as a process where we take unilateral action, we step forward, make commitments, and then we work together through incentives to go beyond that. That it is a joint effort. We have all got to rise together to meet this challenge. In contrast, the U.S.'s view has been let us all make pledges, let us have some weak aspirational goals for 2050 and then call it a day.

The heart of the difference here is, do we do something in 2020 that ensures that we still have the possibility of meeting the goal we want in 2050, or do we sort of see what happens and hope for the best? Basically, unless we make a decision in 2020 that is pretty concrete, we basically wipe out our chance of meeting the budget in 2050.

In terms of EU leadership, as you know, the heads of state of Europe, back in March, agreed to a 20 percent reduction below 1990 levels on their own, unilaterally, regardless of what anybody else does. And they proposed to do 30 percent or more below 1990 if other developed countries step forward and if major developing countries made comparable efforts.

And that really set the bar for the discussion at Bali. It was a very useful signal. And it also sent the signal that the EU sees this as not just a question of narrow competitiveness concerns, but a matter—this is a bigger deal than that; that we can take a hit in the cement industry, the steel industry in the short run in return for solving this much larger problem. I think that is the way we have got to think about this issue.

In terms of developing country leadership, let me ask the team to put the slide up for me. I think this is a statement by the Minister from South Africa, and I think it really captures where we are. He said basically, "Developing countries are saying voluntarily that we are willing to commit ourselves to measurable, verifiable mitigation action." And then he said, "It has never happened before. A year ago, this was totally unthinkable." This is what he said right before the U.S. caved. And I think this gives you a context of how much of a watershed, how much of a breakthrough this was.

Next slide, please.

This shows you quickly the numbers. As Christiana mentioned, the gray line is what Lieberman-Warner would do in 2015. The blue line is what the EU's minus-30 percent target would do. The red line is what China, Brazil and Mexico, with laws on the books today in each of these countries, policies on the books today, if fully implemented, they would make greater total reductions from their business-as-usual levels than the European Union or the Lieberman-Warner bill. So this puts to sleep once and for all this myth about, "Developing countries aren't doing anything, so we shouldn't do anything."

Here are the facts. And, as others have said, this is about car standards, this is about a 20 percent improvement in energy efficiency by 2010. This is by 2010. Lieberman-Warner numbers are for 2015 and 2020. So it gives you a sense of how big this is.

I was in China the last 2 days, discussions with them. I was impressed by how committed they are. A lot of criticism, "Oh, they only got 1 percent the first year." This year they will get 4 percent of that 20 percent goal, and they are making big steps to go further in the coming years.

Let me close with a quick word on competitiveness. I will come back to it, hopefully, in the questions.

Europe has a high-level group on competitiveness. They brought together 500 chief executives. I got to speak there a week before Bali. All the leadership of the European Commission, the Secretary of Commerce, the Secretary of Treasury, the Secretary of Transportation, the Commissioner of Environment, all met. They agreed on a package on competitiveness that says sectoral approaches make sense. Let's offer carrots to developing countries to take a similar carbon-per-ton-of-steel goal, offer some incentives in terms of financing, and we get toward that proverbial level playing field that we hear so much about and Mr. Sensenbrenner was talking about.

This is a much better path, an incentive-based approach, than this idea of putting border tax adjustments on everybody. And Europe talks about border tax adjustments too. The companies are just as worried there as we are here about what happens to our industries. But I think they recognize that there is a much better way forward. And this is something that I would really like to see us do.

The U.S. and the Asia-Pacific Partnership started this thing, but, as usual, they let it die by being unwilling to do anything serious. It is a classic story of everything we touch turns to you know what. That is what has happened in terms of the U.S. position.

So I think there is an opportunity here, there is an opportunity across the aisle here, to deal with this issue, and we really got to grab that piece.

Thank you.

[The statement of Mr. Helme follows:]

Testimony of Ned Helme

President, Center for Clean Air Policy

before the

U.S. House of Representatives

Select Committee on Energy Independence and Global Warming

December 19, 2007
2318 Rayburn House Office Building

Mr. Chairman, Ranking Member Sensenbrenner and Members of the Committee: I would like to thank you for the opportunity to testify before you today. My name is Ned Helme and I am the President of the Center for Clean Air Policy (CCAP), a Washington, DC and Brussels-based environmental think tank.

Since 1985, CCAP has been a recognized world leader in climate and air quality policy and is the only independent, non-profit think-tank working exclusively on those issues at the local, national and international levels. CCAP helps policymakers around the world to develop, promote and implement innovative, market-based solutions to major climate, air quality and energy problems that balance both environmental and economic interests.

CCAP played a leadership role helping to design the European Union Emissions Trading System. Today we are advising states -- particularly California -- on implementing climate policy and advising key developing countries such as China, Brazil, and Mexico on climate and energy policy. We are running a dialogue and providing in-depth analyses for climate negotiators from 30 nations to help them shape the implementation of the Kyoto Protocol and the post-2012 international response to climate change. CCAP also facilitates policy dialogues with leading businesses, environmental groups and governments in the European Union (EU) and U.S. on designing the details of future climate change policies.

In Bali, CCAP convened various high level discussions. With the Governments of Mexico and Norway, we hosted a high-level discussion on post-2012 climate strategies for developing countries. Environmental ministers and heads of delegations from more than 25 countries agreed that any final roadmap produced in Bali must include a package of incentives to encourage developing countries to build upon their unilateral actions to curb greenhouse gas (GHG) emissions and reduce deforestation. CCAP also co-hosted a discussion with representatives from the European Union, John Kerry (the sole Member of Congress in Bali) and other Congressional staff on US and European climate policy.

In the short time I have with you this morning, I would like to leave you with 6 key messages. I will describe each in more detail in a moment:

1. The debates in Bali highlighted a fundamental difference in the approach between the EU and developing countries on one hand and the U.S. on the other. The EU and developing country vision couples unilateral actions with incentives for them to go further. The U.S. vision couples individual pledges with vague references about the degree to which the U.S. will provide technology incentives sometime in the future.

2. The European Union's commitment to reduce emissions 20% below 1990 levels in 2020 on their own, and increase its target to 30% below 1990 levels -- if others join -- sets the bar where it needs to be.

3. The Bali Roadmap – the agreement reached last Saturday – marks a sea change in the climate debate for developing country emissions reduction efforts: developing countries are going farther than ever before in agreeing to "measurable, reportable and verifiable" mitigation actions. This builds upon the recent efforts key developing countries have made to pass laws and policies which, if fully implemented, would generate emissions reductions that would not be surpassed by the Lieberman-Warner bill until roughly 2020.

4. The Bali roadmap includes a positive path to ease competitiveness issues by defining a sector-based approach where developing countries can earn incentives to reduce the carbon intensity of competitive industrial sectors.

5. Including the near-term and long-term emissions reduction ranges in the final Bali agreement would have been helpful. However, more important is assuring that the actions and reductions developed and developing countries take by 2020 maintain some reasonable prospect of avoiding some of the worst impacts of climate change. The jury is still out on whether those actions will succeed.

6. Progress in defining comparable action for developed and developing countries is a critical next step.

What was Agreed to in Bali?

The Roadmap agreed to last Saturday in Bali at the United Nations Framework Convention on Climate Change (UNFCCC) conference is a far-reaching document that lays out the essential elements for a process to reach agreement on the successor to the Kyoto Protocol, which expires in 2012. The roadmap and other key decisions in Bali lay out an international strategy for:

- Developing a shared vision for a long-term global goal to reduce emissions;
- Establishing mitigation commitments or actions in all developed countries;
- Establishing national mitigation actions in developing countries;
- Creating incentives for greater action, including support for deforestation emissions reductions, sector-based approaches (in steel, cement, etc), and development and deployment of cleaner technologies;
- Supporting efforts to reduce deforestation and forest degradation emissions in developing countries by creating a framework for pilot initiatives and signaling that efforts to reduce these emissions will be a part of the post-2012 package;
- Enhancing action on adaptation, including development of vulnerability assessments, prioritization of actions, specific projects and programs, risk management and reduction strategies, disaster reduction strategies; and
- Enhanced action on technology, including agreement to kick-start a strategic program to scale up the level of investment for the transfer of both mitigation and adaptation technologies to developing countries.

Bali Highlights Different Visions for Moving Forward

The debate in Bali centered around a fundamental philosophical difference on how to move forward. On one hand is the shared vision of the European Union, the major emerging economies and other developing countries, and on the other hand is the vision of the Bush Administration.

The EU and the developing world believe all industrialized countries should commit to binding emissions reduction targets, while developing countries should begin or continue to take unilateral actions to reduce emissions -- and then be provided with financial and technological incentives to go beyond those initial reductions.

In contrast, the Bush Administration has called for nonbinding pledges for industrialized countries and has been unconstructively vague about the degree to which it is willing to provide meaningful incentives for developing countries to make reductions beyond their domestic unilateral commitments and for developed countries to take further commitments if others do likewise.

The alignment of the vision of the EU and emerging economies is an important outcome of Bali: concrete unilateral actions and a commitment to go beyond in return for incentives. In the case of the EU, the incentive is joint efforts by the major industrialized and emerging economies to solve the climate problem. The incentive for developing countries to go further is a package of incentives for deforestation reductions, sector-based efficiency improvements, technology, and adaptation.

The EU Commitment to Unilateral Reductions Coupled with a Public Commitment to Go Further Sends the Right Signal

The European Union has taken significant steps. Last March, the EU Heads of State agreed to a groundbreaking climate and energy security policy. They proposed that Europe's 27 nations would achieve a 20% reduction in GHG emissions below 1990 levels in 2020 -- regardless of whether other nations take action to reduce their emissions. As an incentive for others to act, Europe's leaders offered to reduce their emissions by 30% or more below 1990 levels if "other developed countries commit themselves to comparable emission reductions and economically more advanced developing countries contribute adequately according to their responsibilities and respective capabilities".[1]

This was a bold step, one that undoubtedly could have some adverse competitive effects if Europe's major competitors do not take similar steps. This underlines the importance Europe places on addressing the climate challenge, even if some short-term adverse economic impacts might occur. It also reflects the European view that the cost of inaction far outweighs any short-term adverse economic impacts.[2] Additionally, Europe's leaders expressed their belief that action on climate can lead to the development of new technologies and opportunities that can put Europe in the lead in green technologies and industries.

Developing Country Sea Change in Bali

Bali marks a sea change in the global climate change debate. For the first time, key developing countries have played a major role in the debate, committing to take "nationally appropriate mitigation actions…in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner" and pressing the developed world to set more stringent "quantified emission limitation and reduction objectives". Minister Marthinus Van Schalkwyk of South Africa put this eloquently last Saturday morning: "Developing countries are saying voluntarily that we are willing to commit ourselves to measurable, verifiable mitigation action. It has never happened before. A year ago, it was totally unthinkable."

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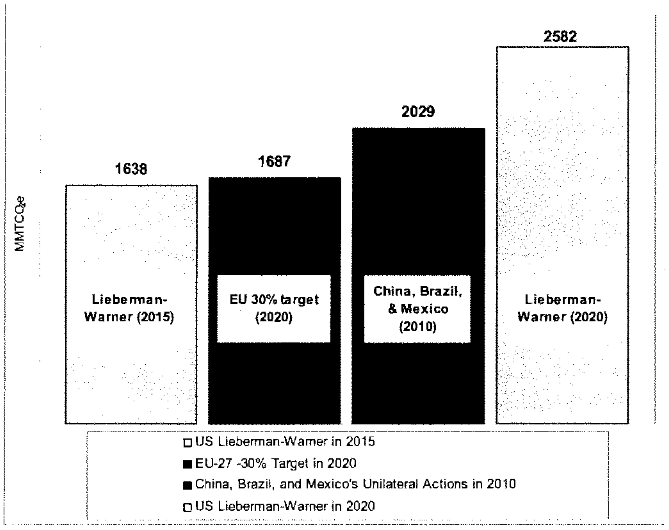
[1] From European Council conclusions March 2007, pg. 12, available at: www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/93135.pdf

[2] See for example, European Commission discussion on this available at (pg. 4): http://eur-lex.europa.eu/LexUriServ/site/en/com/2007/com2007_0002en01.pdf.

Some of this change is explained by progress by a few of the key developing countries that has not necessarily made front page news in the U.S. In the last two years, for example, the key emerging economies of China, Brazil, and Mexico have passed domestic laws and policies that are already reducing their emissions below "business as usual" levels.

In Bali, my organization released a new study, developed with teams from each of those nations, that demonstrates if those new laws and policies are *fully implemented,* those three nations will reduce greenhouse gas emissions in 2010 below their "business as usual" levels. These reductions would not be surpassed by reductions called for in the Lieberman-Warner bill until around 2020[3] (see Figure 1). Those nations are financing the majority of these reductions themselves so far -- they are not financed by industrialized nations as carbon reduction projects under the Kyoto Protocol's Clean Development Mechanism (CDM). For more details on this, see Appendix A.



Source: CCAP, 2007

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[3] (S. 2191), which recently reported out of the Senate Environment and Public Works Committee)

Here in Washington, we often hear the claim from opponents of domestic climate change legislation that developing countries are doing nothing on climate change. As CCAP's study demonstrates, this is simply a myth. Although China continues to have a variety of pollution problems, on climate change China is being bold in a number of areas. For example, China has adopted a goal to reduce the overall energy intensity of its economy by 20% from 2005-2010, has one of the most aggressive vehicle efficiency standards in the world (behind only Japan and the EU), has called for the share of renewable energy (including large hydro) to reach 10% and 15% in 2010 and 2020, respectively, and has shut down inefficient industrial facilities (See Appendix A).

Brazil has taken action to increase renewable electricity, expand the use of sugar-cane based ethanol in transportation, and reduce the rate of deforestation -- which is partly responsible for the reduction in the annual deforestation rate from 2004 to 2006 by nearly 50% (and which is now approaching a reduction rate of 70% based upon preliminary 2007 estimates).

The important point to take away from Bali is that developing countries indicated their willingness to go beyond these already-impressive unilateral actions if the developed world takes decisive action as well and provides additional financial incentives. Incentives included in the Roadmap would need to come in the form of support for step-change technological innovation, emission reduction strategies in key industrial sectors and in deforestation, as well as for adaptation.

The Bali Roadmap Includes a Positive Path to Easing Competitiveness Concerns Through a Sector-Based Approach

Europe shares with the U.S. a concern about the impacts of major emission reduction efforts on a small number of energy intensive internationally competitive sectors – cement, iron and steel, pulp, paper, and oil refining, but its vision of how to deal with competition from the developing world is a bit more nuanced than that of the U.S.

At the end of November this year in Brussels, I had the opportunity to address and participate in the High Level Group on Competitiveness, Energy and the Environment where more than 500 industry executives joined with the Commissioners of the European Commission to finalize a strategy to deal with the competitiveness question. While the Europeans discussed trade sanctions as a tool for ensuring that imports have to meet the GHG emissions standards of domestic producers, this potential tool does not dominate as it does in the U.S.

Instead, the Europeans, and increasingly developing countries, have focused more on a sector-based approach – one that encourages common carbon intensity standards for competitive sectors in developing and developed countries.

This interest in a sector-based approach has grown out of one of CCAP's flagship international efforts, the Future Actions Dialogue, which for more than four years has brought together senior delegates from 30 key countries to sort out policy options for the post-2012 climate change treaty.

Under the sector-based approach, developing countries would unilaterally agree to set carbon intensity targets for key industrial sectors based on a sense of the global "best practice." They would then be eligible for financing related to technological innovation in these sectors in return for taking on even more stringent targets. If they are able to exceed the more stringent targets, they could sell emission reduction credits in the international market equal to the amount by which they exceeded he target. For more information on this approach, see Appendix B.

The EU's High Level Group endorsed this broad concept and it is included in the Bali roadmap. Japan has also been a proponent of this approach, and the U.S. -- through the Asia- Pacific Partnership -- has helped motivate research on global best practices for key sectors. However, as has been the case throughout the climate process in recent years, the U.S. has missed the opportunity to push this further because of its insistence that everything must be voluntary and its unwillingness to propose any mandatory strategies at home, in direct contrast to the EU and to leading developing countries.

While it may be too late to expect this Administration in its waning days to propose concrete GHG reduction policies, the point is that the Bali Roadmap offers some attractive opportunities for the next Administration. If a future U.S. Administration is willing to commit to concrete actions, there is a lot of room in the roadmap to take care of competitiveness concerns.

I also would like to address an unnecessarily alarmist point of view I often hear in the U.S. debate – fear that the leading developing countries will use weak carbon controls as a way to attract plants away from the US. Our study of developing countries (Appendix A) shows that China in particular has taken a number of actions in the cement, iron and steel, and pulp and paper industries in recent years to reduce emissions by closing old plants, requiring a 20% improvement in energy efficiency in these sectors by 2010, and building new efficient facilities. Greater efficiency might make them more competitive, so it seems highly unlikely that they will continue to operate inefficient polluting plants or building new inefficient plants to pull industry away from the US. Moreover, China recently went further than conventional wisdom here in the U.S. would suggest when it eliminated or reduced export tax incentives for energy intensive industries to help meet these energy efficiency targets – a step that could reduce exports.

Controversy over Emission Reduction Targets in the Bali Roadmap

The final area of the Bali Roadmap that garnered much press was the issue of whether a range of emission reduction goals should be included in the final document. In the end, the final compromise linked the Roadmap via a footnote to the range of reductions suggested by the Intergovernmental Panel on Climate Change (IPCC). The EU pushed hard for inclusion of these ranges in the core of the agreement in order to shape future negotiations, while the U.S. opposed it.

In my view, the inclusion of ranges would have been helpful, but focusing on whether they were included or not included distracts from the more important issue -- whether the agreement on what to do after the Kyoto Protocol expires in 2012 (to be agreed upon at the COP 15 in Copenhagen in 2009) will result in aggregate emission reductions by 2020, sufficient to keep open the possibility of holding temperature increases to the EU's stated objective of two degrees Celsius or stabilization of global atmospheric greenhouse gas concentrations to 450 ppm (or less). In other words, will the binding reductions agreed to by the industrialized countries in Copenhagen -- combined with the measurable national actions enacted by key developing countries -- add up to enough by 2020, or will it leave the world with an impossible task in the years beyond 2020?

Critical Next Steps: Progress Defining Comparable Action

While the debate on the ranges of reductions received significant attention in the media, there was less attention on the EU and other developed countries effort to ensure that developed countries commitments after 2012 are based on comparable efforts. Some would prefer to make this debate a simple one – all developed countries should follow Europe's lead and set their reduction goals at 30% below 1990 levels. Such a uniform reduction goal -- paired with serious actions to reduce emissions in key industrial sectors and with reductions in emissions from deforestation -- would do a great deal to keep global emissions on track in 2020 to avert the most damaging impacts of climate change.

But a uniform approach begs the key economic question – are countries making comparable economic efforts with such targets? As part of CCAP's international dialogue, we are attempting to gather the best data from various national and international cost studies to determine the economic impact of various targets on countries in terms of gross domestic product (GDP) and cost per ton of reducing emissions. Although we recognize that comparability is not just a question of GDP impacts, it is one useful indicator. According to the studies we have examined, a uniform target will affect GDP of some developed countries more than others. In the U.S. and Japan, for example, some studies suggest the cost of reducing emissions 30% below 1990 levels in 2020 would be greater than for the E.U. While much more remains to be done on understanding what is comparable and fair, it is likely that comparable efforts will mean different targets for each industrialized country based upon costs and other indictors.

In the coming debate on what is comparable, policymakers will need to balance this fairness notion with the urgency of obtaining enough reductions by 2020 to avert the most damaging impacts of climate change later in this century.

Conclusions

I believe the Bali Roadmap is an excellent path forward. In the U.S., we need to determine how we can make our much needed contribution to this process on a timely basis. While the Bali roadmap is not as aggressive as some had hoped for, it sets a process in motion to deliver a post-2012 international agreement. With effective leadership, all the elements of a strong post-2012 agreement can be delivered from the elements of the Bali Roadmap. The new leadership the developing countries demonstrated in Bali is the big story. The convergence of views between the developing nations and the European Union is a new and welcome development, and it bodes well for the long term success of this Roadmap and leaves a wide berth for the United States to move maneuver.

Thank you again Mr. Chairman for the opportunity to testify today. I am happy to respond to any questions, and I ask that our study of developing country action and our paper on the sector-based approach to developing country action be placed in the record.

Appendix A: Emissions Reduction Actions in China, Brazil, and Mexico

Center for Clean Air Policy
Dialogue. Insight. Solutions.

GREENHOUSE GAS MITIGATION IN CHINA, BRAZIL AND MEXICO: RECENT EFFORTS AND IMPLICATIONS

"UNILATERAL ACTIONS" OF DEVELOPING COUNTRIES

In November 2006, the Center for Clean Air Policy (CCAP) released a groundbreaking report, *Greenhouse Gas Mitigation in Brazil, China and India: Scenarios and Opportunities through 2025*. This report found that while greenhouse gas (GHG) emissions in these three countries are projected to increase (more than doubling in key sectors from 2000-2020), they have already undertaken policies that will slow this rate of growth. The study shattered a commonly held myth that developing countries are not taking meaningful action to reduce GHG emissions, and identified further reductions that these countries could undertake.

Over the past two years, developing countries have adopted additional "unilateral" policies and programs that will reduce their GHG emissions. **This report, *Greenhouse Gas Mitigation in China, Brazil and Mexico: Recent Efforts and Implications*, provides an updated consideration of developing country "unilateral actions."**[1] Once again, we find that full implementation of developing country unilateral actions is estimated to significantly reduce GHG emissions. **The combined emission reductions in China, Brazil, and Mexico from these unilateral measures are estimated to be greater than the reductions under the Kyoto Protocol (without the US), EU's reduction commitments in 2020, and reductions estimated in current US legislative proposals in 2015.** Most of these reductions have been financed domestically, independent of the Kyoto Protocol's Clean Development Mechanism (CDM), and many of these measures are not simply the "low-hanging fruit" in domestic-oriented sectors, but are in fact policies with positive costs in sectors such as cement and iron and steel where international competition is a concern.

As negotiations are about to begin on the structure of the post-2012 international response to climate change, the "unilateral actions" undertaken by developing countries will be a crucial piece of the puzzle. **Recognizing and encouraging these and other "unilateral actions" and providing incentives (and appropriate international policy structures) to undertake further reductions will be an essential element of the post-2012 response.**

CHINA'S "UNILATERAL ACTIONS": AN UPDATE

In 2006, CCAP and Tsinghua University in China estimated that policies adopted between 2000 and the end of 2005 in China would reduce GHG emissions in key energy-intensive sectors below their BAU levels by almost 400 million metric tons carbon dioxide-equivalent ($MMTCO_2e$) in 2020—a combined reduction of over 7%. New policies and programs have been adopted since the end of 2005, and further progress has been made in implementation of a number of the measures identified in the earlier report.

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[1] The more detailed version of this report is available at: http://www.ccap.org/international/Developing_Country_Unilateral_Actions_2007_Update.pdf

China adopted a plan to reduce national energy intensity per unit of GDP 20% by 2010—the achievement of this goal is estimated to reduce China's emissions by over 1,500 $MMTCO_2e$ annually by 2010.

***The National Climate Change Programme* details GHG reduction policies and measures to be adopted through 2010.** Specifically, this plan calls for improving energy efficiency in industry, transportation and end-use sectors; increasing the hydro/renewable energy share up to 10% by 2010; expanding nuclear, IGCC and clean power technologies; and coal-bed methane recovery. The estimated emission reductions from all measures quantified in the report would exceed 1,500 $MMTCO_2e$ by 2010.

While China's energy and climate protection plans are far-reaching and ambitious, it should be emphasized that achievement of the 2010 energy intensity target and the energy efficiency and other goals announced in the national climate plan will depend upon effective implementation and consistent enforcement at both the national and local levels. To date China has had considerable success in implementing climate-friendly measures in key sectors (discussed below), but not all of its short-term goals have been achieved. For example, meeting a 20% improvement in energy intensity by 2010 would require a 4% annual average reduction after 2005, but in 2006 China achieved a reduction in economy-wide energy intensity of only 1.33% (though this was the first decline since 2003). Realization of the full climate benefits of China's plans is thus not guaranteed, and will require a sustained national commitment.

China's renewable energy generation has increased rapidly—even though China is already the world leader in renewable energy (with 42 GW in 2005, excluding large hydro projects), renewable generation has continued to expand rapidly. China's renewable energy plan calls for the share of renewable energy (including large hydro) in primary energy to reach 10% and 15% in 2010 and 2020, respectively.

- At the end of 2006, China had the sixth largest installed wind capacity of any country, and while official plans call for China to reach a total wind capacity of 5 GW in 2010, this level is now expected to be achieved in 2007.

Inefficient power plants are being closed. The *Tenth Five-Year Plan* includes plans to shut down inefficient power plants. In 2006, China shut down 38 small thermal plants with a total installed capacity of 1.2 GW, and in the first ten months of 2007 China shut down another 343 plants with a total capacity of over 10 GW.

A number of outdated cement, iron and steel, pulp and paper and other industrial facilities have been closed. The *11th five-year-period Development Plan for Construction Industry* (March 2007) set a goal for the phase-out of outdated cement production capacity totaling 250 million metric tons (Mt) by 2010 and further plans require that the number of cement enterprises decrease from 5,000 to about 3,500 by 2010 and to about 2,000 by the end of 2020. Further, a policy for the cement industry sets a goal of increasing the share of new, dry-process cement kiln production from 40% to 70% by 2010 and completely eliminating outdated production lines like mechanized vertical kilns by the end of 2008. Progress has been made as the share of dry technology-based production increased from only 12% in 2000 to 45% by the end of 2005, with a 55% target set for the end of 2007.

The NDRC's 2006 notification on the iron and steel industry aims to shut down and phase out outdated capacity. Ten provinces and regions have signed contracts with NDRC with a target of shutting down and phasing out 39.9 Mt and 41.7 Mt of outdated iron and steel production capacity, respectively, by the end of 2010. In the first eight months of 2007, these provinces and regions have shut down or phased out outdated capacity of 9.7 Mt and 8.7 Mt of iron and steel, respectively.

Export tax refunds have been eliminated or reduced for industrial sectors with high energy consumption and pollution in an effort to slow the export-driven growth in these sectors. By the end of 2006, 535 export tax refunds for products had been canceled and as many as 2,268 export tax refund rates had been lowered.

China's vehicle efficiency standard for passenger cars is estimated to be one of the most stringent in the world. *The Maximum Limits of Fuel Consumption (L/100-km) for Passenger Cars* are estimated to produce an equivalent vehicle efficiency of 34 miles per gallon (MPG) in 2005 and 37 MPG in 2008. Phase I of this program went into full effect in 2006, and Phase II will take effect on January 1, 2008, for new models and on January 1, 2009, for existing models.

Vehicle excise taxes are now based on the vehicle engine size—ranging from 3-20% of the vehicle purchase price—with the tax on four-liter engines (e.g., SUVs) more than doubling from 8% to 20% (to about $8,000 per vehicle).

Some of these actions have been undertaken at a positive economic cost. While precise cost estimates for these unilateral actions are not available, many of the renewable opportunities in China are estimated to cost greater than $10 per metric ton CO_2e reduced, and the overall investment needed to accomplish the 2020 renewable energy goal is estimated to be about $267 billion.

A number of reductions are being financed domestically, without support from the Clean Development Mechanism, and are thus becoming China's "contribution to the protection of the atmosphere." China has a total of 860 projects in the CDM pipeline with average total reductions of 224 $MMTCO_2e$ per year. Of this total, 574 are renewable energy (biomass, hydroelectric, wind, and solar energy) electricity generation projects—accounting for an average reduction of around 63 $MMTCO_2e$ per year—far fewer reductions than the 142 $MMTCO_2e$ estimated in the electricity sector for 2020 through "unilateral actions." In addition, there are 118 projects in the cement and iron and steel sectors (but none in pulp and paper production) accounting for 23 $MMTCO_2e$ per year—significantly lower than the 220 $MMTCO_2e$ reductions in 2020 from unilateral actions in these three industrial sectors. Lastly, the improvements achieved from the vehicle efficiency standard have not been developed into a CDM project—so the estimated reductions of 34 $MMTCO_2e$ are not being captured by CDM projects.

BRAZIL'S "UNILATERAL ACTIONS": AN UPDATE

Based on its 2006 study, CCAP and its in-country partners estimated that recent government policies and programs adopted in Brazil between January 1, 2000 and December 31, 2005 in the industrial and transportation sectors would reduce GHG emissions by 14% from BAU levels in 2020—a total cut of 73 $MMTCO_2e$. New policies and programs have been adopted since the end of 2005, and further progress has been made in implementation of a number of the measures identified in the earlier report. As in the case of China, however, harnessing the full benefits of the measures already undertaken in Brazil will require consistent and successful implementation of each measure in the years to come.

Recent policies have contributed to a decline in the deforestation rate for the past two years. The *Action Plan for Protection and Control of Deforestation in the Legal Amazon (PPCDA)*, launched by the Presidency in 2004, was created to develop measures to reduce deforestation in the Amazon through fiscal incentives to enhance the economic potential of deforested areas, and to encourage programs that can create income through regeneration of degraded areas. In addition, the 2002 *Amazon Regions Protected Areas Program (ARPA)* aims to protect the forest by bringing 50 million ha (12%) of the Brazil Amazon into a network of parks and reserves over ten years. From 2004 to 2006, the annual rate of deforestation declined by nearly 50%, to a level (14 thousand km^2 in 2006) not seen since the mid-1990s. The fall in the deforestation rate is estimated to have avoided emissions of more than 442 $MMTCO_2e$ in 2006, assuming that the rate of deforestation in 2006 would have been the same as the very high rate observed in 2004 and that this is maintained. The decline has been attributed in part to the government forest protection plan, although macroeconomic factors such as a fall in commodity prices also have played a role.

Renewable energy sources have expanded. The *Program for Incentive of Alternative Electric Energy Sources (PROINFA),* launched in 2002, sets an overall goal to produce 10% of the total electricity from renewable sources by 2022, in two phases. The first phase is to achieve 3,300 MW of renewables through long-term power purchasing agreements and fiscal incentives. PROINFA has made Brazil the largest wind power producer in Latin America, with total capacity of 1,423 MW expected to be operational by the end of 2008.

Flex-fuel vehicles (which can run on ethanol and/or gasoline) dominate new car sales. Brazil's efforts to expand ethanol production and use since the 1970's laid the important groundwork for the introduction of flex-fuel vehicles. As a result, these vehicles accounted for 84% of new car sales as of June 2007. These types of vehicle now account for 12% of the entire national fleet, and their share is projected to rise to 52% by 2013.

Some of the emissions reductions achieved through these policies are not being developed as CDM projects and are thus becoming Brazil's "contribution to the protection of the atmosphere." Brazil has a total of 240 projects in the CDM pipeline with average total reductions of over 24 $MMTCO_2e$ per year. The introduction of Brazilian flex-fuel vehicles and the associated emissions reductions have not been registered as a CDM project, so the total estimated reductions in the transportation sector from "unilateral actions"—44 $MMTCO_2e$ are estimated to be mitigated in 2020—are not being scored as a CDM project. Similarly, since deforestation emissions reductions are not eligible for CDM credits, the large drop in emissions from deforestation are not being converted to CDM credits.

MEXICO'S "UNILATERAL ACTIONS"

In May of 2007, **Mexico formally released its *National Strategy for Climate Change***, or ENACC (its Spanish acronym), which identified the most promising GHG mitigation opportunities in Mexico. The ENACC is now being used to develop an official climate plan for the country. Full and effective implementation of the energy measures identified in the ENACC is estimated to reduce GHG emissions by 106.8 $MMTCO_2e$ annually through 2014. Prior to implementation of these new measures, Mexico has adopted a variety of additional policies and measures that are already serving to reduce its GHG emissions below business-as-usual levels.

Recent policies to expand renewables and increase energy efficiency have been adopted. The *Law for the Use of Renewable Energy Sources (LAFRE)* establishes a goal of achieving 8% of electricity generation from renewable energy sources, excluding large hydroelectric facilities, by 2012. The National Commission for Energy Conservation (CONAE) established energy efficency standards for appliances which are estimated to have resulted in GHG emissions savings of 8 $MMTCO_2e$ in 2006. Similarly, energy efficiency programs and the use of daylight savings time in summer adopted under the Electric Power Saving Trust Fund (FIDE) are estimated to have reduced GHG emissions by 5.6 $MMTCO_2e$ in 2005.

Forestry measures adopted are estimated to reduce emissions. The ProÁrbol reforestation program is expected to avoid 15-35 $MMTCO_2e$ through 2012. Similarly, a program to revive degraded forest lands and promote sustainable commercial forestry projects is estimated to save between 3 and 7 $MMTCO_2e$ from 2001-2008 and up to 30 $MMTCO_2e$ by 2020. Additionally, a fund was established in 2003 to pay owners of forested land to conserve their carbon and water resources.

"UNILATERAL ACTIONS": COMPARING TO OTHER REGIONS

With full implementation, **combining the measures identified in our earlier report with these new measures[2] yields total annual GHG emissions reductions in China, Brazil, and Mexico that are greater than the annual reductions under the Kyoto Protocol (without the US), EU's reduction commitments in 2020, the reductions estimated in the early years of the main US legislative proposals** (see figure)—with a total reduction of 2,029 $MMTCO_2e$.[3]

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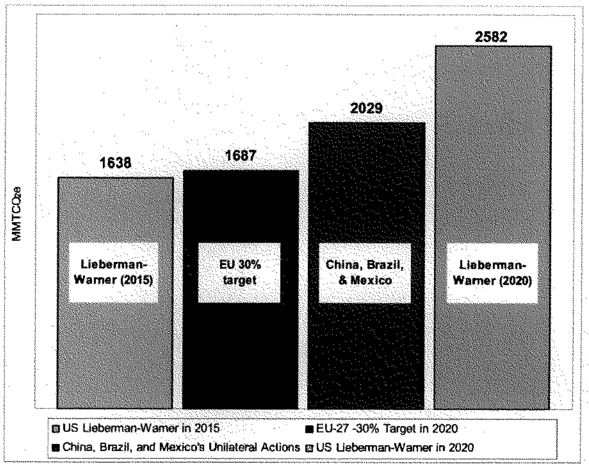
[2] Includes only the estimated reductions from: meeting the Chinese economy-wide energy efficiency target in 2010 of 1,500 $MMTCO_2e$; the impact on emissions in 2010 of Brazilian measures adopted from 2000-2005 and the recent reduction in deforestation emissions in 2006 compared to the 2004 rate (for a total of 515 $MMTCO_2e$); and reductions in 2005/2006 from energy efficiency programs in Mexico of 13.6 $MMTCO_2e$.

[3] For more details on the numbers used for this and the subsequent comparisons, see the more detailed report available at: http://www.ccap.org/international/Developing_Country_Unilateral_Actions_2007_Update.pdf.



According to one estimate, meeting the Chinese goal to improve economy-wide energy intensity by 20% from 2005-2010 would generate reductions of over 1,500 $MMTCO_2e$ in 2010. Combined with forestry and non-CO_2 gas reductions outlined in the Chinese *National Climate Change Programme*—about 280 $MMTCO_2e$ cumulative over the 5-year period—even greater reductions could be achieved. **These reductions in China alone would be greater than the reductions required to meet the EU's commitments for 2020 of 20% below 1990, and are on par with the reductions achieved by the most stringent current US legislative proposal in 2015**—1,183 and 1,204 $MMTCO_2e$, respectively.

The recent reduction in deforestation rates in Brazil is estimated to have produced emissions reductions of 442 $MMTCO_2e$ in 2006. Combined with the reductions estimated from policies adopted from 2000-2005—73 $MMTCO_2e$ in 2020—implementation of recent Brazilian policies is estimated to generate reductions of 515 $MMTCO_2e$. **This reduction is equivalent to over 40% of the reduction estimated for the EU in meeting its target to unilaterally reduce emissions 20% below 1990 in 2020 and over 30% of the reduction in the most stringent US legislative proposal in 2015.**

The existing energy efficiency measures in Mexico are estimated to have reduced emissions by around 14 $MMTCO_2e$ in 2005/2006. Further, the energy measures identified in the Mexican *National Strategy for Climate Change*, if fully implemented, would yield an estimated reduction of 107 $MMTCO_2e$ per year—**equivalent to about 20% of the EU-15's domestic reductions under the Kyoto Protocol** of 573 $MMTCO_2e$ in 2010.

Since 1985, CCAP has been a recognized world leader in climate and air quality policy and is the only independent, non-profit think-tank working exclusively on those issues at the local, national and international levels. Headquartered in Washington, D.C., CCAP helps policymakers around the world to develop, promote and implement innovative, market-based solutions to major climate, air quality and energy problems that balance both environmental and economic interests. For information about CCAP please visit www.ccap.org.

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Appendix B: The Sector-Based “No-Lose” Approach

THE SECTOR-BASED – "NO LOSE" – APPROACH

WHAT IS A SECTOR-BASED APPROACH?[1]

- ***Bottom-up method*** for encouraging sectoral targets (e.g. steel, cement, electricity) in developing countries and for deriving Annex I country targets. Each sector is rewarded for beating the target, but not punished for falling short ("no lose").

- There are two overarching structures for sector-based approaches:

(1) ***country-based*** – individual countries are responsible for ensuring the emission levels of the covered sectors meet the targets
(2) *transnational* – targets are established for entire sector's operations worldwide.

WHICH COUNTRIES PARTICIPATE?

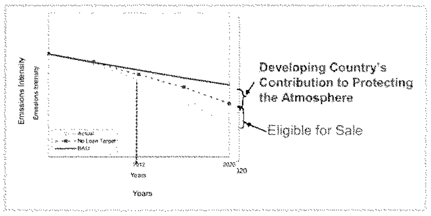
- ***Developing countries would voluntarily adopt sector-based approaches*** in the post-2012 timeframe. **Developed countries** would commit to further economy-wide targets.

- Participation of less than ten developing countries in key sectors account for 80-90 percent of emissions from these sectors in developing countries – so covering global operations and reducing competitiveness concerns can be achieved with the participation of a limited number of countries.

WHAT WOULD DEVELOPING COUNTRIES DO?

- Developing countries would ***adopt voluntary "no lose" GHG intensity targets (e.g., GHG / ton of steel)*** in key sectors of the economy (e.g., electricity and major industry). Other target structures – such as fixed growth targets (i.e., with a defined growth), benchmark-based (i.e., requiring that a defined benchmark is met), sector credit generation, and harmonized policies and measures – could also be used at the international level.

- The "no lose" target would not be binding, however similar to the Clean Development Mechanism, ***emissions reductions achieved beyond the "no lose" target would be eligible for sale*** as emissions reductions credits to developed countries.



- Emissions reductions to meet the country's pledge would be ***the developing countries "contribution to protection of the atmosphere"*** and would not be eligible for sale.

- A ***Technology Finance and Assistance Package would be provided*** from developed countries and international financial institutions to adopt more aggressive targets, incentive advanced technology transfer and deployment, and help drive technology cost down over time.

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[1] For more details on this approach, see: www.ccap.org/international/Sector%20Straw%20Proposal%20-%20FINAL%20for%20FAD%20Working%20Paper%20-%208%2025%2006.pdf

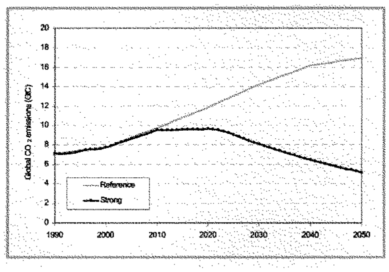
WHICH SECTORS WOULD PARTICIPATE?

- ***Electricity and major industry sectors*** (e.g. cement, iron and steel, oil refining, pulp/paper, etc) are well-suited to such an approach because they are characterized by: a relatively small number of entities, comparatively easy data collection, fairly similar products and participate in international trade. Most importantly, these sectors combined produce approximately 1/3 of developing country emissions and 1/3 of global GHG emissions.

- The approach could be expanded to other sectors, such as passenger vehicles, transportation fuels, appliance standards and LUCF emissions, with some modified design elements.

WHAT IMPACT COULD THIS APPROACH HAVE ON GLOBAL EMISSIONS LEVELS?

- Such an approach could make significant progress toward helping stabilize GHG emissions at a low level based upon preliminary modeling. With a combination of new Annex I country national targets and sectoral targets in the cement, electricity and steel industries within key GHG emitting developing countries, global emissions could be held to around 35 percent above 1990 levels in 2020, a level that arguably maintains the possibility of stabilizing emissions at 450-550 ppm CO_2e. It would require reductions of a little more than 2 percent per year after 2020 to stabilize emissions at 550 ppm CO_2e and 5 percent per year to stabilize at 450 ppm CO_2e. This level provides approximately a 50 percent chance of holding global emissions to less than 2°C increase.



- With only intensity targets adopted in these key sectors across the world, and without further economy-wide developed country targets, global emissions in 2020 would be higher (around 50 percent above 1990 levels) and require even greater reductions after 2020 (around 4 percent per year to stabilize at 550 ppm CO_2e and even greater for 450 ppm CO_2e). This underlines the importance of maintaining economy-wide caps for the developed countries as opposed to shifting to a global intensity-based sectoral approach.

HOW DOES THIS APROACH IMPROVE UPON THE CURRENT INTERNATIONAL STRUCTURE?

- ***Creates explicit recognition and quantification of developing country "unilateral" actions,*** such as China's policies to improve industrial efficiency. Under this approach, developing country "no lose" targets would constitute new contributions to the reduction of atmospheric concentrations of GHG emissions.

- ***Moves the post-2012 process significantly towards a "level playing field."***

- This approach would mean that ***all GHG emissions generating facilities in a given sector in a participating developing country would be included in the system***, unlike in the CDM where only a limited number of facilities in a sector participate.

- The new Technology Finance and Assistance Package would ***encourage the development and transfer of new climate-friendly technologies in developing countries***, precisely the technological innovation required if the world is to achieve emissions stabilization at safe levels.

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The CHAIRMAN. Thank you, Mr. Helme.

Energy bill, step one. Mandatory cap, auction and trade next.

Our next witness is Myron Ebell. Mr. Ebell is director of energy and global warming policy at the Competitive Enterprise Institute. Before joining the Competitive Enterprise Institute, Mr. Ebell focused on environmental issues as policy director for Frontier of Freedom, as a senior legislative aide for our good friend and colleague on this committee, Congressman John Shadegg, and has also served as the Washington representative of the American Land Rights Association.

We welcome you, Mr. Ebell. Whenever you are ready, please begin.

STATEMENT OF MYRON EBELL

Mr. EBELL. Thank you, Chairman Markey. And thank you for having me here today.

I am sorry to say I cannot begin by congratulating you on the anti-energy bill that was enacted. One of the reasons I was not able to go to Bali this year is that you all have been keeping us so busy with things that we oppose. But I do—but congratulations for getting it through. I am not pleased, but congratulations.

The CHAIRMAN. Mr. Ebell, I did not go, but I went by Avatar to Bali. And I would recommend that the next time you can't travel.

Mr. EBELL. Right. Right. Well, I have been to many of these. You know, it is interesting that 15,000 people were so eager to get out of our winter temperatures and fly to a tropical paradise. Of course, they used a bit of energy. I don't hold that against them.

I would also like to say I am very pleased that two members from my native State are here. One of them I consider my own Congressman. He is from the right side of the Cascades, as I like to think of it.

I would like to say I think that the Bali talks need to be put in some kind of context. And what I would like to say is that if global warming is a problem, then the Kyoto approach cannot possibly be part of the solution. It is being tried halfheartedly in some of the countries that ratified the Kyoto Protocol, and it is not working. Even in the European Union, where global warming is a religious commitment, emissions are going up. Emissions have been going up since Kyoto was ratified in 1997; they are continuing to go up.

They are going up much more rapidly in some European nations than in the United States, even though those nations have lower economic growth and virtually no population growth. Our emissions have tracked population growth, and we have been putting on about one point of emissions growth for every point of population growth. And we have been putting on about three points of economic growth for every point of emissions growth. Spain has been putting on more than one point of emissions growth for every point of economic growth, for example.

Now, if Europe were really serious about this issue, I think there would be some indicators. For example, if the Brown Government decides not to go ahead with the new runway at Heathrow, or if they decide to cancel the proposed coal-fired power plants, or if the German Government decides to back down on auto emissions controls and tells that their big auto makers will just have to stop producing so many big cars, I think that would be an indication that they are serious.

But, you know, we have this cap and trade before the Congress. Cap and trade is not working in Europe except to benefit big special interests. Places like hospitals are having to buy credits from big oil companies, for example. This is a huge wealth transfer, but it is not an emissions reduction program.

And I have brought copies of a paper, an exhaustive paper, by a think tank in London, Open Europe, that shows why the European emissions trading scheme is not working. I would point out that the preface to that large paper is by a Green Party member of the Swedish parliament.

Now, I generally agree with Mr. Sensenbrenner about Bali. I think there are reasons to be positive.

And I would say, first of all, the U.S. tends to be isolated at all of these negotiations on multilateral environmental agreements. And the reason is because we are unusual in that, if we ratify a treaty, it has the force of law and it can be enforced in Federal courts against the administration and against the Congress. That isn't true of any other country in the world. That is why if Japan or Canada or the European Union fail to meet their Kyoto targets, they will say, "Oh, well, we tried. We are morally superior because our intentions were good." That would not be possible if we ratified the Kyoto Protocol or a succeeding agreement. We would have to do what we said. It could be enforced in Federal court.

But I do not think the U.S. is isolated anymore at these negotiations; I think it is the European Union that is isolated. The United States now leads that. And you will see this if you look at the positions of Japan, Canada, Australia even, even the new government in Australia, Russia, many of the G77 members, and I think we have found a lot of common ground with China and India.

Very briefly, the common ground is mandatory regulations won't work if the technology and economics don't work; that, therefore, future agreements must first focus on technology, on adaptation and on some side issues, which I think are important, like forestry.

So I will stop there. Thank you very much.

[The statement of Mr. Ebell follows:]

Competitive
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Testimony

before the
Select Committee on Energy Independence and Global Warming
Honorable Mr. Edward J. Markey, Chairman
United States House of Representatives

on

After Bali – the UN Conference and the Impact on International Climate Change Policy

by
Myron Ebell
Director of Energy and Global Warming Policy
Competitive Enterprise Institute

Washington, D. C.
19th December 2007

Chairman Markey and Members of the Committee, thank you for inviting me to testify today on the important topic of the outcomes of the global warming talks in Bali last week. My name is Myron Ebell. I have served as director of energy and global warming policy at the Competitive Enterprise Institute (CEI) since 1999. CEI is a non-profit, non-partisan public policy institute that concentrates on regulatory issues from a free-market perspective. CEI does not accept government funding. CEI is an NGO accredited to the United Nations Framework Convention on Climate Change, and CEI's President, Fred Smith, attended the 1992 Earth Summit in Rio de Janeiro. CEI has sent NGO participants to many of the succeeding Conferences of the Parties, including COP-3 in Kyoto in 1997. I have been an observer of the Kyoto process from the beginning, and, although I did not attend this year's COP in Bali, I have attended several previous COPs since joining CEI.

The general outcome of COP-13 in Bali seems to me to be remarkably similar to the outcomes of most previous COPs. What usually happens is that, at the last minute and on the brink of failure, triumph is snatched from the jaws of defeat by the extraordinary negotiating efforts of the UNFCCC secretariat and the government ministers attending. The triumph is embodied in a document, the substance of which is that a new consensus has been reached that represents a breakthrough or a conceptual agreement or the way forward or a road map. When this consensus is examined a little more closely, it is almost always found to consist of the intention to continue negotiating plus a pledge to reach agreement on all outstanding issues by a date certain.

Bali followed this generic script. As Fiona Harvey and John Aglionby reported in the *Financial Times*: "At last, the world had agreed to talk again about the shape of a new international framework to avert dangerous climate change."

Another notable aspect of these negotiations in recent years has been their insulation from reality. It has often seemed that the negotiators have been determined to produce another piece of paper without taking any notice of whether the commitments made in previous pieces of paper are being fulfilled or even paid any attention. At Bali, I think, a glimmer of reality made its way into the negotiations. This is a most welcome change and will lead to further positive changes in the negotiations if pursued. Therefore, before discussing the specific outcomes in Bali, the roles of the United States and other key countries, and what I believe should be the goals for future climate policies, I would like to discuss some of the realities that provide the backdrop to Bali and all future negotiations on a post-Kyoto global warming treaty.

It is now apparent that the Kyoto Protocol is a dead end. The reality is that, since Kyoto was agreed in December 1997, greenhouse gas emissions have continued to increase in every nation that undertook commitments to reduce emissions. In many countries that ratified Kyoto, emissions have actually increased at a faster rate in percentage terms than in the United States, which did not ratify Kyoto. In Canada, neither the current government nor its more pro-Kyoto predecessor has developed a plausible plan to meet Kyoto's targets. The United States and Canada have had similar rates of population and economic growth from the Kyoto baseline year of 1990 through 2005, but Canada's greenhouse gas emissions have increased 26%, while those of the United States have only increased by 16%. Japan has had little population growth and far less economic growth than the U. S., yet Japanese emissions are up 7%.

The failure of Kyoto's mandatory targets and timetables is nowhere more apparent, yet nowhere less acknowledged, than in the European Union. In Spain, to take the most extreme example, emissions have increased 53%, closely tracking economic growth of just over 50%. For comparison, the U. S. economy has grown roughly 3% for every 1% increase in emissions. Moreover, population growth has equaled emissions growth in the U. S., so that per capita U. S. emissions have remained steady since 1980.

The European Commission continues to assert that the EU will meet its Kyoto targets with "continuing and additional measures". This is highly unlikely without a major economic recession. The EU's principal continuing measure is its Emissions Trading

Scheme. A recent exhaustive analysis by Open Europe, a London-based think tank, concluded that the ETS had failed miserably in its first commitment period and was almost certain to continue to fail in the 2008-12 Kyoto compliance period. Open Europe's report, "Europe's Dirty Secret: Why the EU Emissions Trading Scheme isn't Working," also details how some special interests are making huge profits at the expense of consumers.

Another continuing measure to reduce emissions is high gasoline taxes. Taxes have been increased to exorbitant levels in most western European nations, so that the typical price of gasoline is now over $7 per gallon. Yet emissions from the transportation sector have increased 26% since 1990, according to the European Environment Agency. It should be noted that each one dollar of tax per gallon of gas translates into a tax of approximately $100 per metric ton of carbon dioxide emissions.

As for the EU's additional measures, these are proving difficult to adopt. Instead, the British government is on the verge of approving a new runway at Heathrow Airport and is considering applications to build a number of new coal-fired power plants. The German government has applied for special exemptions for its coal industry and on behalf of its auto industry is resisting the European Commission's new proposal to regulate auto emissions.

As a recent article in *Nature* magazine titled "Time to Ditch Kyoto" noted, the Protocol "has produced no demonstrable reductions in emissions or even in anticipated emissions growth." And thus, "the Kyoto Protocol was always the wrong tool for the nature of the job." The authors conclude that it is necessary "to radically rethink climate policy."

The reasons why these command-and-control regulations are failing to reduce greenhouse gas emissions are simple: (1) central planning doesn't work; (2) the alternatives to hydrocarbon fuels cost far too much; and (3) the necessary technology isn't available yet. Those are the realities, but I am aware that claims to the contrary have been made constantly for the past decade. Therefore, let me briefly review these claims.

The major source of economic optimism about the costs of reducing emissions is provided by the Stern Review of the Economics of Climate Change. Sir Nicholas Stern and his team of two dozen or so professional economists produced a most impressive 700-page report that displays all the technical tools of the economics profession. It concludes that the costs of global warming between now and 2200 will be from 5% to 20% of total global economic output, whereas the costs of reducing emissions by 60% below 1990 levels by 2050 would amount to only 1% of total global economic output. Thus reducing emissions is a great deal.

The Stern Review's conclusions have not stood up to professional scrutiny. Professor Richard S. J. Tol's review of 102 econometric studies of the costs of global warming published in peer-reviewed journals concluded that the negative externalities, that is the costs, of global warming would be equivalent to a tax of no more than $12 per metric ton of carbon dioxide emissions. That would depress demand for coal somewhat, but would do little to reduce auto emissions, since it would only raise the price of gasoline by 12 cents per gallon. Setting a realistic price on emissions would, Tol concluded, thus do little to reduce emissions.

Similarly, Yale University's Professor William Nordhaus, one of the world's leading economists, recently published a study that estimates that the damages to 2100 caused by a global warming of 3 degrees C will be $22 trillion. Achieving the Stern Review's emissions targets by 2050 would reduce the damages to $9 trillion, but the measures necessary would cost $27 trillion.

Another way of analyzing the Stern Review's conclusions was provided by Sir Partha Dasgupta, the Frank Ramsey Professor of Economics at Cambridge University. Sir Partha noted that Stern's estimated costs of only 1% of total global economic output to 2200 would have to be paid by 2050. Thus the costs should have been averaged over the next 43 years rather than the next two centuries. Since the model Sir Nicholas used projects much higher global economic output in the 22nd century than in the 21st, the effect of paying for emissions reductions between now and 2050 is a massive re-distribution of wealth from the current relatively poor generation to much wealthier future generations. Sir Partha estimated that it would require a 97.5% savings rate in the current generation to pay for the necessary emissions reductions. As my colleague Marlo Lewis has remarked over the years, this truly is a policy of all pain and no gain.

The news is no better from the technology end of the debate. Claim after claim is made about one alternative technology or another being available now or right around the corner. It is true that there are many promising technologies, but they do not begin to meet more than a small fraction of the world's future energy needs. The Energy Information Administration's most recent International Energy Outlook forecast that world energy demand would increase 71% between 2003 and 2030. Currently, approximately 85% of the world's energy is supplied by hydrocarbon fuels. EIA forecasts that in 2030, approximately 85% of the world's energy will be supplied by hydrocarbon fuels.

The Department of Energy has recently produced some estimates of what would be required in terms of alternative technology to reduce emissions by 59% below 1990 levels by 2050. Global emissions in 1990 were roughly 21 gigatons of carbon dioxide-equivalent. In 2005, global emissions had increased to 27 gigatons. EIA forecasts emissions in 2050 of 48 gigatons. To reach the target will therefore require global emissions reductions of 35 gigatons below the EIA baseline projection. A slide show I recently saw given by Stephen D. Eule of DOE listed what would be needed to reduce emissions by just one gigaton—and 35 are required. For example, build 136 new nuclear plants of 1 gigawatt capacity instead of new coal-fired power plants. Or build 14 times the current total number of windmills in the world. Or replace 273 million cars that get 20 miles per gallon with 273 million cars that get 40 miles per gallon. Or build 273 new zero-emission 500 megawatt coal-fired power plants. Currently, there are three or four demonstration coal-fired power plants that can capture and store about two-thirds of their carbon dioxide emissions. To again quote my colleague Marlo Lewis, setting mandatory targets and timetables before the technology is available to meet those targets and timetables is setting the regulatory cart before the technology horse.

These are the realities that I think need to be considered as the Parties to the UNFCCC embark on a new round of negotiations on a post-2012 agreement. Although the Bali Action Plan largely follows the failing framework of the Kyoto Protocol, there are several glimmers of hope. The plan recognizes the importance of adaptation. Efforts to prevent deforestation are also in the plan. Most encouragingly, the European Union's insistence that the action plan commit the Parties to a long-term target of mandatory emissions reductions of 50% below 1990 levels by 2050 was dropped. For countries that are failing to meet their Kyoto targets by picking the low-hanging fruit that we hear so much about to then promise to meet much harder targets is just lunacy. Moreover, it seems almost impossible that rapidly developing nations such as China and India would take seriously such a mandatory target when they can see clearly that the European Union, Japan, and Canada are not meeting the much easier Kyoto targets.

While the EU and its member nations continued to play an irresponsible role at Bali, I think it is fair to say that the delegations representing United States, Canada, and Japan made positive and constructive contributions to the negotiations. Together, they can be seen to be trying to get the world off its Kyoto fixation and to begin looking for alternative policies that might address the potential challenges of global warming in ways that will not consign hundreds of millions of people in poor countries to perpetual energy poverty.

To build on these promising beginnings during the course of the negotiations will in my view require several further recognitions and realizations. First, the major developing nations need to recognize that playing the game they have been playing may seem clever now, but won't work over the long haul. China and India have enthusiastically supported a second round of mandatory emissions cuts for the developed nations, but not for them. They hope that in a second round the developed economies will have to pay billions and billions of dollars to them to install modern emissions-saving technologies and also that energy-intensive industrial production will continue to move from carbon-constrained economies to theirs. China, India, and other developing and poor countries understand that going on an energy starvation diet when you are already energy poor offers far more pain than gain. The potential harms caused by global warming are minor annoyances when compared to the immense benefits of affordable energy. Instead of playing a cute double-faced game, China and India should articulate the reasons why the demands from the energy-rich nations for them to accept mandatory emissions reductions before the technology is available to make those reductions affordably are simply another form of eco-imperialism.

Second, the United States needs to adopt the same positive approach rather than continuing to insist that no second round of mandatory emissions reductions can be agreed unless China, India, and the other major developing nations also agree to some level of mandatory reductions. I think that Senator John Kerry was correct when, as reported by the Associated Press, he remarked in Bali that the United States Senate would probably never ratify a deal that didn't require America's growing economic rivals to make comparable sacrifices. A recent study produced by the Pacific Northwest National Laboratory for the Department of Energy demonstrates conclusively that pursuing emissions reductions in the U. S. without requiring reductions by the major developing economies would in fact be pointless. That is because emissions growth in the developing economies is going to swamp proposed reductions in the developed economies.

But standing on that position in international negotiations will only lead to endless and increasingly acrimonious disagreements. The United States needs to realize that it is also a major developing economy and should make common cause with India and China to pursue policies that are based on the world's energy needs. As long as population continues to increase in the United States, emissions are going to increase as well. The developing countries, including the United States, should agree on an agenda that is based on the simple facts that the world is not energy rich, it is energy poor, and that for the foreseeable future most of the energy the world uses is going to come from hydrocarbons.

Those simple facts should be the starting point for producing realistic and positive global warming policies. The goals of the new round of negotiations in my view should therefore address global warming as a potential problem within the context of the energy needs of the world's poorest people as well as of the world's richest people. What do I think those policies would look like? Because access to energy is so important, I think the first emphasis should be on avoiding regulatory climate policies that would have high costs in the near term in order to avoid potential problems in the long term. These problems may turn out to be real, but future societies will be much better equipped to handle them than we are.

The second emphasis should be on developing and deploying new energy technologies. That has been President Bush's position since 2001, and it was given institutional form with the creation of the Asia-Pacific Partnership for Clean Development and Climate. Special attention should be given to reducing the tax and regulatory policies that discourage investment in new technologies. As new technologies become commercially viable, they will be adopted without requiring regulatory mandates.

The third emphasis should be on increasing adaptive capacity and building resiliency in societies. As several important papers by Indur M. Goklany have shown using official IPCC and British government data, the costs of addressing potential adverse impacts caused by global warming directly are much lower than by addressing them indirectly through emissions reductions. Mr. Goklany has also shown that the IPCC computer model forecasts of future temperature increases predict that a richer-but-warmer world will be better off than a poorer-but-cooler world. Modern industrial societies are already resilient, not least because they have lots of energy. Subsistence societies, on the other hand, are vulnerable to bad weather and to changes in climate. Building resilience in poor societies requires access to modern energy.

Thank you, Mr. Chairman, this concludes my testimony. I would be happy to try to answer any question that you or other Members of the Committee may have.

The CHAIRMAN. Thank you, Mr. Ebell, very much.

The Chair will now recognize himself for a round of questions.

First you, Mr. Clapp, and you, Mr. Meyer. Do you think that the major economies meetings initiated by the United States can make any positive contribution to the U.N. negotiating process, or are they more likely to undermine it?

Mr. CLAPP. I think what is important, Mr. Chairman, is that the administration's objectives in the major emitters talks are quite unclear. We have two sets of talks going on here simultaneously.

I mean, there is an aggressive agenda that has to be followed to achieve an agreement in Copenhagen under the U.N. process by 2009. At the beginning of the Bali conference, the Chairman of the White House Council on Environmental Quality delivered a letter to the other delegates outlining a process of monthly meetings between now and July, all over the world, with an agenda to come to some sort of agreement by a leaders summit in July.

Well, every country only has so many global warming negotiators. It is very unclear to me, and I think the administration should make clear what its objectives are, because it has the prospect of really undercutting the ability to continue the U.N. negotiations.

The CHAIRMAN. Mr. Meyer.

Mr. MEYER. Let me just build on that. I think it could be a useful process if the U.S. would put forward a specific proposal of what we want to do. The European Union has said that they want to try to stay below the 2 degree Celsius temperature increase that I mentioned. Japan has put forward its Cool Earth 50, calling for a 50 percent reduction in global emissions by 2050. The U.S. refuses to put any specific proposal on the table.

And I asked about this in Bali. I said it is like inviting people to a dinner party and not serving food. The main purpose of the September meeting was to talk about the global long-term goal. The U.S. put no proposal on the table. If they don't put a serious proposal on the table in Honolulu, my own view is it is not a serious effort.

If not 2 degrees, what? What risk are we willing to take with the planet? What risk are we willing to commit future generations to? Is it 3 degrees, 4 degrees, 10 degrees? We don't know. The administration refuses to put forward a concrete proposal either for long-term global reductions or for near-term industrialized country targets.

The CHAIRMAN. Thank you, Mr. Meyer.

Mr. Ebell, in your testimony you say that global warming may be a problem in the future, but we should leave it to future generations to deal with it, because they will be better equipped to do so.

Do you reject the IPCC's conclusion, endorsed in the Bali roadmap, that climate change represents an urgent problem and that continued delay will foreclose options to save the planet?

Mr. EBELL. That is an involved question, but I would say, in general, yes. I think that if you look——

The CHAIRMAN. You do reject it?

Mr. EBELL. Yes. If you look at the most extreme scenarios from the IPCC computer projections, you will find that, even under what is called the A1 FI scenario, in 2100 the high-growth, high-emissions scenario leads to a richer and warmer world rather than a poorer and cooler world under some of the emissions-constrained scenarios.

So I think, in fact—to give you another example, cold weather kills a lot more people than warm weather. About over 10 times more people die from cold weather every year than warm weather. Now, we know that, under the global warming theory, most of the warming will occur in the upper latitudes in the winter. And all the projections from all of these models are exactly—they mirror what has been happening in the 20th century; namely, hot-weather mortality has been going down, but cold-weather mortality has not been going down nearly as much.

The CHAIRMAN. Thank you, Mr. Ebell.

Mr. EBELL. So, from a simple utilitarian calculation, a little bit of warming in the upper latitudes will lead to an increase in human flourishing.

The CHAIRMAN. Let me go to Ms. Figueres.

Your testimony discusses the watershed decision of developing countries at Bali to agree to consider mitigation actions under a new global climate change agreement.

Given the current administration's intransigence on climate change, what explains developing countries' willingness to open up to this discussion?

Ms. FIGUERES. Thank you, Mr. Chair.

The willingness comes, I believe, from desperation. The fact that the United States has been completely unwilling to live up to its very visible responsibility has led developing countries to say, okay, then that means that we need to accelerate the pace at which we will accept our responsibility in order to bring the United States on board. And I think, really, this is a very, very frank invitation to bring the United States on board.

And if I could just add one comment to your question previously about the memo, from the developing-country perspective I think one of the major issues and arguments that has been said by the United States is that they needed a parallel process because the developing countries were not willing to play fairly within the climate regime. Bali has proved that that is no longer a valid argument.

Thank you.

The CHAIRMAN. Thank you.

My time has expired. The Chair will recognize the gentleman from Wisconsin, Mr. Sensenbrenner.

Mr. SENSENBRENNER. Thank you very much, Mr. Chairman.

As you know, I am, kind of, more a veteran of the climate change wars than any of my colleagues that are sitting here on the dais. And I harken back to what Senator Kerry said at Bali, and that is that any treaty that does not involve the third world is doomed to failure in the United States Senate.

I think that is a given, that is a political fact of life. And I salute Senator Kerry as a leading Democrat in making that observation to delegates who might not have wanted to have heard that message.

Now, that being said, I guess I would like to ask the panelists to briefly say, as a result of Bali and the softening of the administration's position, the signing up of the developing countries, and particularly China and India, do you think we are going to hear less demagoguery from the European Union on this subject?

Because what the EU has been saying, and particularly what the Germany Environment Minister, Herr Gabriel, has been saying, certainly is not going to bring about the type of consensus needed to wrap this up in 2 years.

Who would like to be first?

Mr. HELME. My sense is that we really saw a coming together of the EU with the developing world and most of the other nations in agreement on how to move forward. And I think, as I said in my testimony, the EU's putting these targets out set a bar that was very useful. I think——

Mr. SENSENBRENNER. Okay. Now, let me interrupt you on that. The deal that was made in Berlin, which exempted the developing world and gave the EU a much lower emissions reduction target, the so-called EU bubble, as a result of two factors that occurred since 1990 that had nothing to do with this issue, basically was a deal where the developing world didn't have to do anything and the EU was able to what we refer to in this business as "pose for holy pictures" in playing a game of economic "gotcha" against the U.S. and Japan and Russia and perhaps some smaller countries like Australia and Norway as well. Now, if we are going to continue playing the game of economic "gotcha," you are not going to see very much support in the United States Senate for what proceeds henceforth.

And, you know, I think that what I am interested in seeing is whether the EU will admit not only that Kyoto was a failure but the mistake that made Kyoto a failure was the agreement that came from Berlin in 1995.

Mr. HELME. I think there are two responses.

One, we are beyond that, as everyone on the panel has said. I mean, we basically had that clear statement that verifiable national actions will be part of this. And we have the track record I presented in terms of what China, India, Brazil and Mexico have already done.

I think in terms of the EU, they did make significant reductions, and they are now prepared to participate in that larger effort that will go forward in terms of with developing countries. So I think we are going to see a significant package coming forward.

So we are beyond, sort of, the history of, did we do the right thing on Kyoto or not? We have now stepped up to the point where everybody is going to now take real steps.

Mr. SENSENBRENNER. Unfortunately Mr. Markey and I couldn't go to Bali because we were busy doing the job we were elected to do here. But reading the quotes in the press, particularly from Minister Gabriel, did not give me much heart that the EU had gotten the message, and particularly the largest economy within the EU, which is that of Germany.

Mr. EBELL. Could I reply to your question, Mr. Sensenbrenner?

I think we really can't expect much more from the European Union than demagoguery because that is really all they have. They are not willing to take the actions that they committed to to reduce their emissions. And, as you have already noted, their emissions went down between 1990 and 1997 for reasons that had nothing to do with emissions reductions.

And so, I think what we can hope for in future negotiations is that the U.S., together with Japan, Canada and other several leading nations, will be able to lead these negotiations out of the Kyoto dead-end. And as long as the EU is unwilling to match its actions to its rhetoric, I think they will become more and more marginalized in this.

Mr. HELME. Mr. Sensenbrenner, the facts simply don't bear out what Mr. Ebell is saying. And for the record——

Mr. SENSENBRENNER. Mr. Helme, it is my time. And I will just say that the two factors that allowed the EU to reduce their emissions from 1990 to 1997 were the fact that Mrs. Thatcher decided to put the British coal-miners union out of business and change electric generating in the U.K. from coal to natural gas, and the merger of East Germany and West Germany and the closing of the Stalin-era East German industries which belched hot air and greenhouse gases and were environmental disasters and workplace safety disasters. That had nothing to do with compliance with the Rio Treaty.

My time is up. I yield back.

The CHAIRMAN. The gentleman's time has expired.

The Chair recognizes the gentleman from Oregon, Mr. Blumenauer.

Mr. BLUMENAUER. Thank you, Mr. Chairman.

And I would invite any of our other panel members who would like to submit for the record their view of reality in this regard.

And I would just like to begin by saying how much I appreciated the testimony that has been presented in written form. They are terrific documents dealing with the broader context, and the reference that we are really sort of moving beyond Kyoto, we are moving to a new era, the rest of the world is moving in an exciting direction. And I really appreciate the context that you have provided. I think this ought to be required reading for everybody in Congress. I think it would be extraordinarily helpful. But I do invite you to supplement your submission.

Part of what is interesting for me is that the United States, under a Republican administration, made some commitments, made commitments. This didn't pop out of the Clinton administration or other fuzzy-headed people. This was the result of negotiations where the United States was a partner. And the United States turned its back on implementation and, in fact, resisted that.

Let's go back to where that was in 1992. It is not that it is impossible. And you have documented some of the area. I come from a city that is at 1990 level of emissions and has had 4 consecutive years of—and I appreciate, Mr. Ebell, that is on the other side of the mountains. But it is doing something that has actually helped that community, and it has met those commitments.

Mr. WALDEN. Careful now, the other side of the mountain thing.

Mr. BLUMENAUER. Just referring back to his testimony, just his testimony, Greg.

I am intrigued, however, about where we go from here. I have been in a number of international meetings where the United

States has been dragging its feet, not because it is going to get sued, but because it would be held accountable. I mean, think about our failure to meet our commitments in terms of global water and sanitation, where we were, in Johannesburg, a retarding influence, not because we would be sued but because we would have to perform.

I am curious if, as we are moving into this next year, where it is an election year, where we have greater consensus around the world, where the people who have been dragging their feet, both in the developing and the developed world, are sort of launching ahead, I am wondering if our panel has some suggestions or recommendations of what we might do in that next step, Mr. Chairman, as we plot things that might find their way into law and help frame the next steps.

If we can just briefly have our friends respond.

Mr. MEYER. Let me start, because I think the agreement reached in Bali does create a place for that conversation.

The United States is neither fish nor foul. We haven't ratified Kyoto so we haven't participated in the discussions since Montreal in the last 2 years, the working group there, about mitigation potential, cost-effectiveness, what we can do vis-a-vis other industrialized countries. And, of course, we are not a developing country, so it is not appropriate for us to try to put ourselves in the same box within the convention.

We have an agreement now creating the space for developed non-Kyoto countries like the U.S. to put on the table what they can do, to have civil society come in and talk about analysis that has been done in the United States about the cost-effective mitigation potential, to have other others put forward their information about that.

This next year is really an analytical and research, get-the-facts-right year to prepare for the serious, hard bargaining in 2009. And there is a space there for Congress, for civil society, for our national labs, for NGOs, to put forward the facts as we see them about how much the U.S. can do.

Mr. CLAPP. Mr. Blumenauer, I would really encourage the members of this committee, as I have many Members of the Senate, to become personally involved in these negotiations. Because we are going to find ourselves in a position, regardless of what the Congress does next year in terms of debating legislation, where it is extremely likely that we will be in the middle in the winding up of major negotiations concluding in a treaty at the same time that Congress is seriously moving forward on the first legislation that will bind the United States to emissions reduction.

So the two debates are going to affect each other. And I think it is rather incumbent upon Members of the Congress to begin talking to a number of foreign governments and really familiarizing themselves with this position, because the two debates are going to collide.

I want to go back for a moment to what Mr. Sensenbrenner was asking. Regardless of what one wants to say about the European Union and the effectiveness of the measures it is taking, according to our own Department of Energy, Europe's projected emissions increases between now and 2030 are .3 percent per year. Japan's will be .1 percent per year. That is one-third and one-tenth of projected U.S. increased emissions.

So there has been a significant—for whatever reason—and there are policy reasons for it—Europe and Japan are actually making major progress in improving their emissions, whereas the United States, to go back to Myron's comment, is currently in violation of its treaty obligations under the Framework Convention on Climate Change, and we are 18 percent above our 1990 levels.

Mr. BLUMENAUER. I am happy to have given the remainder of my time to the answer to Mr. Sensenbrenner's question.

Mr. CLAPP. My apologies.

Mr. BLUMENAUER. No, no, no.

Had I had time, Mr. Chairman, one area that I happen to agree with Mr. Ebell—and I think my colleague from Oregon, Mr. Walden, would concur—that there is a huge role in terms of worldwide practice of forestry, what happens in this country. I am going to be lobbying you. We have some legislation pending on illegal logging. But there are a range of things. This might be something that might be worthy of a hearing in the future where we could, I think, make some real progress.

Thank you, sir.

The CHAIRMAN. Great. The gentleman's time has expired.

And Mr. Sensenbrenner is a formidable proponent of this opposition, so I think this is very helpful for everybody to have a chance to come back at Mr. Sensenbrenner.

Mr. HELME. Could I have a reaction and then an answer?

The CHAIRMAN. No. I think other members will give you that opportunity.

The Chair recognizes the gentleman from Oregon, Mr. Walden.

Mr. WALDEN. Thank you, Mr. Chairman.

And I want to thank our panelists for their testimony today. It is helpful to get your views on this topic.

I want to pick up on a couple of points, one from my friend and colleague from Oregon, and ask you each to talk about what the United States could do domestically on forest practices on its own land that might assist in carbon sequestration or mitigating against unnecessary release of carbon and other greenhouse gases, principally because the record wildfires we are seeing and given the Forest Service's analysis over the last decade of warming climate and its effect on forest, with drought and bug infestation.

And if you could keep your answers fairly brief, because I have got another question, is there anything specifically you or your organizations have relative to management changes you would recommend on Federal forest lands?

Mr. EBELL. Yes, indeed, Mr. Walden. I grew up on a ranch in Baker County, Oregon. We still own that ranch. It adjoins BLM and Forest Service land, so I have a great deal of practical experience in Federal land management.

And I would say the very most important thing you could do would be to privatize the national forests. The management of those forests is a disaster. It is a continuing disaster. They change management practices and philosophies, but the continuing undercurrent is it is always a disaster, because they don't have the incentives to manage their land properly, the way private owners do.

Thank you.

Mr. WALDEN. All right. Thank you, Mr. Ebell.

Mr. Helme, do you have any comments? Again, briefly.

Mr. HELME. I think there is a very interesting provision in the Lieberman-Warner bill that would be attractive here. In the allocation of allowances, they provide some of the allowances to forestry and agriculture folks who make improvements—reforestation, afforestation and so on. The idea here is it is not offsets, it is in addition to. So you have a basic cap, then you take so many allowances out of the pool, sell them for the money, pay the money to farmers——

Mr. WALDEN. Would that apply to Federal forest lands?

Mr. HELME. Only in-holdings, not—no. These would be for private people, basically.

Mr. WALDEN. All right.

Ms. Figueres.

Ms. FIGUERES. I could answer that with respect to our countries but not with respect to the United States. I will hold off.

Mr. WALDEN. All right.

Mr. Clapp.

Mr. CLAPP. I will pass. I think that Ned covered what I would have said.

Mr. WALDEN. All right.

Mr. Meyer.

Mr. MEYER. I can ask our forestry experts to get a response for you for the record. It is not my area of expertise. But one of our scientists is the lead author of the IPCC's "Land-Use Change and Forestry" chapter, so I will try to get something for you on that.

Mr. WALDEN. That would be helpful. I would appreciate it.

Mr. HELME. One additional suggestion would be to keep, in this debate, in essence, at Bali, we are looking at national baselines for performance of forests across the board. We do that sort of informally in the U.S. It would be very useful to do that and sort of keep track of what are the net flows on these Federal lands.

Mr. WALDEN. Right. That would be helpful. And, certainly, the work internationally on forestry I think is extraordinarily important. We all recognize the importance of healthy forests in sequestering carbon. Eradication of the forest doesn't help. And, certainly, these fires we have seen in the West are a real problem.

I want to move to carbon sequestration technology. I was in Europe with the Energy Committee earlier this year. We were looking at different facilities.

Can anybody talk to me about the status of existing technology to do both capture and compression and then sequestration? Is the technology available today? If I have a coal-fired plant, is there technology available to me today that will capture, compress, which you have to do, and then sequester carbon? And if not, what is the timeline to get there?

Mr. HELME. My sense is the answer is yes, that we have done the different steps in carbon capture sequestration at different points. We haven't done it in one integrated way. The oil industry has done this for years with oil refineries, where they capture the carbon and, of course, then reinjected for secondary and tertiary oil recovery.

So I would argue the technology is there. We still have some questions about the cost. I mean, if you talk to Exxon, for example, some of the major oil companies, they feel they can do this. They know how to capture it. They do it now, in terms of secondary oil recovery.

So I think it is there. It is a question of putting all the pieces together. It is not something the utility industry has done. It is something more of the chemicals and the gas and the oil industry.

Mr. WALDEN. Sure. But I am trying to find out—because when we did SO_X and NO_X, the acid rain capture, those emissions, that technology, I understand, was available at the time that cap and trade was put in place. And I keep hearing that this technology for carbon capture compression sequestration is not perfected yet.

Mr. Meyer.

Mr. MEYER. Let me just build on what Ned said. I think the technology is available. It is a question of price. My understanding is it would add now somewhere of 60 to 70 percent to the price of a conventional coal plant to retrofit this technology on. And then, when you are going up to scale, to find the reservoirs to permanently sequester the carbon is a challenge that our agencies are working on. There is demonstration projects around the world.

The goal, I think, of DOE is to try to get that increased cost down to maybe the 10 to 15 percent range, so it is more viable economically. But even there, we are going to have to help countries like China and India cover that spread between conventional unconstrained coal and carbon capture and storage coal.

Mr. WALDEN. Two questions on that point, as a follow-up. Is the issue about where do you put this carbon, how do you keep it there, and what happens if it comes out?

And the second is, have you cost out the additional price per megawatt hour, kilowatt hour, whatever matrix you want, that this capture and sequestration will add to, say, the average power bill?

Mr. CLAPP. Mr. Walden, I think we are at the point where the real issue is demonstrating the cost at scale. You have utilities in the United States. I mean, Jim Rogers of Duke Energy has said this publicly many times, that he simply cannot justify to his shareholders, because there is no regulatory or legislative requirement in place, the kind of investment that is necessary to do demonstration projects. And that is where we are, at this point.

Mr. WALDEN. So you are telling me that I could go out today if I owned that coal-fire plant and that technology is available to me to put in my smoke stack or carbon stack, whatever we call it now, and the technology is there to run a tube and put the carbon in the ground?

Mr. CLAPP. No. What I said is that we need the demonstration projects that bring it up to scale.

Mr. WALDEN. So it is not available now?

Mr. CLAPP. It is not available at a commercial scale now.

Mr. HELME. You need incentives to make it go.

Mr. WALDEN. I am trying to get the first piece, which is, is it technologically ready? What does it take to get there? And then, at what cost?

Mr. EBELL. I think it is ready in the sense if you are willing to spend a lot more money and you are willing to do it at a small scale.

I think that two things should be really kept in mind. One is the current technology only captures two-thirds of the carbon dioxide that is produced. And secondly, I think the real thing, besides the technology, are the legal and political obstacles to transport and pressurize storage underground. I think those are——

Mr. WALDEN. We heard that in Europe, too, that if carbon is a pollutant, you are putting a pollutant in the ground, and some laws will have to be changed here and elsewhere to deal with that.

Is that true?

Mr. HELME. That is true.

I would add, in terms of Europe, Mr. Sensenbrenner's favorite topic, Europe has committed to building 10 or 12 of these demonstration plants by 2015. They will have in place next year a new framework for regulating this very question you are asking. It will be completed by the end of 2008, so that we can go forward with those plants.

I think what we need here is we need the same kind of commitment in terms of demonstration. We are still just trying to build one FutureGen.

Mr. WALDEN. Thank you, Mr. Chairman.

The CHAIRMAN. The gentleman's time has expired.

And I will just make this point, that, as part of the legislation the President is signing related to energy, that there is $6 billion, $6 billion worth of Federal Government loan guarantees for carbon capture and sequestration in the legislation. So we are also moving much more aggressively on that path.

Mr. BLUMENAUER. Mr. Chairman, I am concerned, with the lateness of the hour, people have missed lunch. I have an alternative energy source: a fruit cake that I make every year. It may not be legal after the next round of environmental protection. So I was just going to pass this down here, if there is no violent objection.

The CHAIRMAN. Mr. Sensenbrenner is raising ethics questions, but I think we will say that, for the purposes of our Congressmen, we can accept fruit cake from other Congressmen.

The Chair recognizes the gentleman from Washington State, Mr. Inslee.

Mr. INSLEE. Thank you.

Fruit cake, the ultimate renewable energy, I suppose.

I wanted to ask Mr. Helme to elaborate on the European experience of the carrots rather than the sticks on imports from countries that don't have aggressive carbon measures.

Could you tell us how mature those efforts are and what successes they may have had and what lessons we ought to learn?

Mr. HELME. Okay. I would be happy to.

As I mentioned, the U.N. has this high-level group on competitiveness, energy security and climate. And it has been meeting for 2 years. And I participated 2 weeks ago in this high-level conference with 500 executives there. They agreed on a path that would be to encourage key developing countries to work with them on setting carbon intensity goals for key competitive sectors, so cement, steel, pulp and paper, oil refining, that sort of thing. And the idea here would be you do a benchmarking, so you say what is the best-practice technology today for a wet kiln cement plant? That comes at some level of carbon per ton of cement produced.

You would ask the Chinese to look at that, figure out what that means in terms of the context of China in terms of its cost picture, could they do that with a pay-back or is that going to cost them a fair amount, what does that look like. You then ask the Chinese to set a target. And the Chinese would be offered incentives in the form of technology finance to go a little further, to set a little tougher target.

That would be their target. It would be a no-lose target. They would set that target as part of their commitment in this next period, 2012 to 2020. They would receive the financing as an initial incentive on the technology side. And then if they beat the target, they could sell credits into the international market.

This is an idea that has been tested among developing countries. Shown a lot of interest in it, because they are interested in the same way, thereafter improving the efficiency of these sectors. So it is got an appeal on both sides.

It moves you toward that level playing field, so that all of us would have a similar kind of commitment to technology, and we would take this carbon issue off the table. It doesn't take labor costs off the table, but it takes the carbon issue and the technology issue off the table, and it gets the new technology in the hands. If you talk to China, what do they want from this treaty? They want the most advanced technologies. And this is a way to offer that to them.

And the EU sees this as a very promising incentive path, which gets us to the same place I want to go. I want a level playing field in cement and steel so I don't lose market share based on carbon standards. And that is where we are heading.

So a very promising opportunity, as opposed to I am going to stick you with taxes or I am going to make you buy allowances if you are not doing as well as I would like you to do in terms of your carbon program. So it is a much more positive approach.

Mr. INSLEE. You said if they met or exceeded these standards, they could sell credits into the system. Was there a cost if they did not meet these standards?

Mr. HELME. No. There would be—understand that to get this financing for technology, they have to have a contract, they have to build the plants, they have to operate the plants. They can't just say, "Oh, thanks, we like the money, and it is very nice." It is a contractual arrangement between that country and the Annex 1 countries, who are often the financing.

And they can use that money for a variety of things. We were in discussions yesterday in China about their 20 percent goal. And one of their difficulties is getting the provinces to meet those targets. They set the national goal; it is the law. But then they have to get this done at the local level. So they are saying, well, could we use the money for tax credits, could we use the money for having the cement association in China work with its members to get compliance? And that is the kind of thing we are looking at.

And it is a good opportunity of collaboration with the World Business Council for Sustainable Development and others. So it is a very promising opportunity.

Mr. INSLEE. What is the best way to really delve into that proposal from Europe? I mean, has anybody got sort of a master paper describing that?

Mr. HELME. I can certainly share with you, I think, as I mentioned earlier, the U.S. is on this path. The Asia-Pacific Partnership is developing the very benchmark data. The trouble is the U.S. has no credibility because, at the end of the day, they won't put any money on the table for incentives and they won't take any targets. If they did, their good idea would get a lot of momentum.

I mean, I think Myron was saying there is some collaboration with China and India. There is. But the point is, where is the beef, where is the incentive money? That has what has been lacking. Where is the action?

Mr. INSLEE. Could you put up that—you had a graph showing relative improvements in CO_2 between the U.S. under McCain-Lieberman and Chinese existing——

Mr. HELME. Yes. Here it is. Can you see it from back there? The red is China, Brazil and Mexico. The blue is the European Union's 30 percent target that they set for 2020. The gray on the left is Lieberman-Warner in 2015. And the green on the right is Lieberman-Warner in 2020. So to give you a feel for the targets.

And these are reductions below business-as-usual, okay. Because, remember, China is growing 100 percent, so they are shaving the growth. These are not reductions from 1990 levels or anything like that. But it still shows you that—and this is laws on the books today.

This isn't projections of what they might do some other time. This is laws on the books today, if fully implemented, if they did 100 percent implementation, which is always tough in developing countries.

Mr. INSLEE. Take this with a grain of salt. I mean, I haven't studied this. But it is actually—what is interesting to me, if you look at that graph, is even if we adopt McCain-Lieberman, even if it was implemented, we are still just marginally ahead of the amount we would be reducing compared to China, even if we adopt a cap-and-trade system, relative to their measures already.

Mr. HELME. That is exactly right. And China's numbers are for 2010. McCain-Lieberman-Warner is 2020. So they are doing this faster by 10 years, which is what we need actually.

Mr. INSLEE. So is that a comment on—and I support the cap-and-trade system.

And my time is up, so I will talk to you after this hearing. Thank you.

The CHAIRMAN. The gentleman's time has expired.

The Chair recognizes the gentleman from Missouri, Mr. Cleaver.

Mr. CLEAVER. Thank you, Mr. Chairman.

I would like to also say God bless Mr. Blumenauer for the spirit of giving. Thank you, sir.

The gentlewoman from Tennessee has left. And I certainly will not be disrespectful. On two occasions, she has presented the word, the European "scheme," as if it is something like the guy who was able to drill underground in Texas when I was a kid to tap into other oil. That was a scheme. In Europe, the word “scheme” is—the English word “scheme” is synonymous with the word “plan,” “diagram.” It has nothing to do with some kind of system of ripping off folks. It means map; it means sketch. And it gives off the impression to some that the Europeans are announcing we are ripping you off. And if they were doing that, they would use another word. So she has done that twice, and I just wanted to say that.

The other thing, Mr. Ebell, I wasn’t sure if you were serious when you were saying that the forest should be operated privately. Were you making a point, or do you actually—I mean, do you——

Mr. EBELL. Mr. Cleaver, absolutely. Federal land managers do have the correct incentives to take care of what they are managing because they don’t own it. So, yes, absolutely.

Mr. CLEAVER. Okay.

The developing nations and the poorer nations must figure this risk that are especially vulnerable to climate change, particularly concerning floods and droughts and other disasters. These nations, like many of those in sub-Saharan Africa and southeast Asia, are least responsible for the effects of global warming.

What can the nations of the world like the United States, like the EU, do to assist some of the poorer countries, third-world countries in attaining the technologies to compensate for the effects of global warming? Costa Rica probably is not necessarily in that category, but certainly southeast Asia and African nations are.

Ms. FIGUERES. Yes, exactly. Southeast Asia, Africa, all the small island states and the low-lying, least-developed countries are all in that situation. This is, in fact, one of the major inequities of climate change, the fact that you say that all of these countries are major victims without having contributed to the problem in the past or in fact in the future in most of these countries.

What the United States could do very concretely is contribute to the various instruments that are being developed. One of the issues in the Bali decision, one of the chapters, is adaptation; and there are very concrete measures there as to what all countries could do together in order to support particularly those countries that will need to adapt and that actually urgently need to adapt before they completely disappear like the small island developing states.

In addition to contributions to the adaptation fund, there is finally some decision on the governments of the adaptation fund and that also would require a very clear leadership of the United States both in terms of financing as well as in terms of ascribing where funds would go to.

Mr. CLEAVER. Thank you. Mr. Meyer.

Mr. HELME. Just commenting on that, Congressman, the thing to get clear here is the scale of the need. The World Bank estimates that we need 40 billion or 50 billion a year. OXFAM’s estimate is 50 to $80 billion a year as a starting point to build capacity in these countries to deal with adaptation in the climate change. We are putting two orders of magnitude less a year on the table, hundreds of millions, not tens of billions.

The other point I would make is that we have to do aggressive mitigation if we want to make an adaptation of infeasible. We did an analysis, for example, for our own State of California for Governor Davis and Governor Schwarzenegger, which showed if have you an aggressive mitigation path in California and the world you would lose about half of the Sierra snow pack by 2090. If you have business-as-usual growth, you would lose virtually all of the Sierra snow pack by the middle of the century; and that's the drinking water supply for California, that's the central valley irrigation. That's when Governor Davis and Governor Schwarzenegger got it. This is a core economic issue.

So to have adaptation be feasible and even on the bounds of being affordable, you have to have the most aggressive mitigation scenario you can have. Even with that, we are going to have impacts that we are experiencing now that will get worse over the next 20 or 30 years. It is our moral responsibility to help these countries who had no role in creating this problem deal with the consequences of our past behavior.

Ms. FIGUERES. Just to add a half a sentence to that, yes, it is the moral responsibility; and it is not just a moral responsibility. Actually, from the point of view of the United States, this is a long-term security issue for the United States. If you think that we are having a hard time now dealing with the immigration issue in the United States, that is nothing compared to the climate immigration waves that we will have unless we help these countries deal with the situation on their own territory.

Mr. CLAPP. Let me just add one more comment to that.

The nation projected to be the most rapidly impacted in terms of loss of water supplies worldwide is actually not in Africa. It's Mexico. So the question of immigration—is a very serious one.

In addition, this actually has implications for the targets—the worldwide reduction targets that were on the table in Bali. Those are actually projected, no matter how aggressive they may seem in our context, to provide us with only a 50 percent chance of avoiding the worst impacts of climate changing. So the measures were not extremes.

Mr. CLEAVER. How much time do I have left?

The CHAIRMAN. Five seconds.

Mr. CLEAVER. General Motors National Park—I mean——

Mr. EBELL. No. No. I am sorry. I do not support the privatization of national parks, but in terms of managing our national forest they are and they have been for a long time a disaster, and it is because people who don't own things don't have the incentive to take care of them. They have the incentive to use them up.

Therefore, I really think that the best thing we can do in terms of adopting the good kinds of forestry practices that Mr. Walden has been an advocate of would be to privatize the national forest. They wouldn't end up in General Motors' hands, but a lot of them would probably end up in Ted Turner's hands. So you can have either good or bad feelings. I don't know.

Mr. CLEAVER. Enron National Park.

The CHAIRMAN. The gentleman's time has expired.

The Chair recognizes the gentleman from New York State, Mr. Hall.

Mr. HALL. Thank you, Mr. Chairman, and thank you all for your testimony.

I wanted to ask Mr. Meyer, regarding that worst-case scenario, which is Bali gives us a 50 percent chance if we manage to put this agreement together of avoiding—what is your organization projecting as likely sea level rise should we hit that worst-case scenario?

Mr. MEYER. Well, it is not what my organization is projecting. It is what the International Government Panel on Climate Change is projecting, that has been certified by all governments in the world. If you read line by line, there are a couple of stories there: one, that the sea level rise we are going to see from thermal expansion and glaciers melting, that kind of thing—what is really not okay was the more rapid—our concern about disintegration of the Greenland ice sheet, the Antarctic ice sheet. Some renewed science is coming out about the flow rates there and the water going down and lubricating the flow of those glaciers.

I would encourage you to have a hearing with some of the top experts on that in the world. Because there is a lot of concern in the science community that there may be more on the table there than was captured in the recent IPCC report, which had a close-off date of the end of 2005 for the peer-reviewed literature that it could take into consideration in its findings.

This is of great concern to the scientists that study the ice sheet model and the ice sheet flows, and I encourage to you have a separate hearing just on that issue.

Mr. HALL. Thank you, sir.

I represent a district which is divided by the Hudson River, which is tidal, all the way to Troy past Albany; and of course any increase in sea level will also be an increase in river level, which will be then added to by tidal changes and storm waves and surge and so on. So it does effect us directly, including those communities like Beacon and Newburgh and Kingston and others that have newly refurbished their waterfronts with restaurants and stores and promenades, not to mention the commercial rail running up just above river level on the west bank of the Hudson and the Amtrak and MTA commuter line that runs carrying passengers up the east bank just above the water level of the Hudson currently.

I am curious, given the fact that the executive branch tends to be the face of our Nation to many around the world, we in Congress are trying, as you know, to change energy policy; and we were just successful in getting a decent energy bill. It wasn't perfect, but then no legislation is, I suppose. We hope that this will show the world that we are serious or getting serious on this issue. What else would you recommend that Congress do to send this message to other countries around the world?

Mr. MEYER. I think, as my colleague, Phil Clapp, said, participate in this process as part of the U.S. delegation, talk to the delegates about what is going on. I was amazed how very aware they are of the actions of this Congress. They knew when the energy bill was coming to the floor. I got e-mails the day after the committee reported out the Lieberman-Warner bill by an 11 to 8 vote from Japan, from Europe, from developing countries congratulating the United States for the work that committee had done.

They follow our politics very closely because, as Christiana said, they realize they are in our hands. What we do is going to matter to their future. And I think participating in this process, going over to meet with them at these meetings or on your own, inviting them to come and testify or even meet with you here, the exchange of views between the rest of the world and civil society and the other branches of government in the United States is a key issue and I think will improve their confidence in going forward in the next 2 years in this process.

Mr. HALL. I am just going to jump ahead, because my time is limited, as is all our time.

I am happy to see one of the key topics in Bali is technology transfer and that helping developing countries to leapfrog over fossil-fuel-powered development is on the map. America has the technological know-how and resources to bring many of these technologies into play to help developing countries jump into a clean energy future.

Perhaps Ms. Figueres and Mr. Helme could comment on what steps our government should be taking to aid the process of technology transfer, which would also make us an energy and technology exporter, as opposed to this fuel importer that we are mostly now.

Mr. HELME. As I mentioned, I think there is a great deal of interest in sharing technology, particularly in these internationally competitive industries, and so I think the U.S. joining in this effort with Europe and others to provide assistance directly for innovation and linking it to developing countries, taking more aggressive targets—I mean, the theory from Bali is—as I showed you, they'll do more if there is assistance for technology, for sectorial activity in terms of these key investment sectors, for reductions from deforestation.

So I think there is a big opportunity for us to put something on the table and draw forward. I think one of the ways to do it is to take a portion of the allowances—we are seeing this. Norway is doing it. Germany is doing it. But if you are taking allowances out of their system, auctioning those and using the money as incentive money to help developing countries move forward and get more reductions.

Ms. FIGUERES. On the private sector side, the studies that have been done on financial flows that are necessary in order to address climate change show that more than half—in fact, above 60 percent of the financial flows will be coming from the private sector, as opposed to from the public sector.

And so in that sense once a policy, both nationally and internationally, is in place, that will be enough to signal to the markets and to signal to the private sector that they can go ahead and make the investments; and those investments will then translate into the technology transfer the developing countries need.

Mr. HALL. Thank you very much, Mr. Chairman.

The CHAIRMAN. The gentleman's time has expired.

Let's do this. We will give each one of you 1 minute to summarize what you want us to remember. The energy bill is done. Bali is completed. Climate change, cap and auction and trade is now front and center in the United States House of Representatives and Senate next year. What do you want us to remember from this hearing as we go forward and begin this great project that is about to be undertaken?

We will go in reverse order; and we will begin with you, Mr. Ebell.

Mr. EBELL. Thank you, Mr. Chairman.

I would urge you to keep—as you consider energy rationing policies, to keep in mind the energy needs not only of this country but of the world. And I would just make this particular observation that Mr. Hall said earlier. He encouraged people to adopt a polar bear. I think that is great.

My colleague who is here today in the audience, William Yeatman, was a Peace Corps volunteer in Krygyzstan; and he will—if you want to contribute $50 to buy a ton of coal to keep a Kyrgyz family warm during this very cold winter in Krygyzstan, he will be happy to arrange that for you. Those are the real energy realities of the world. There are a lot of people who do not have enough energy to live the kinds of lives that we lead.

And I would just think back to another great Member from Massachusetts, John Adams. When he was elected to the Continental Congress, he was a leading citizen of Boston, but he had to walk to Philadelphia. That is still the reality for a lot of the world.

Thank you.

The CHAIRMAN. Thank you, Mr. Ebell, Mr. Helme.

Mr. HELME. Number one, I would say moving legislation at least as strong as Lieberman-Warner is the most important thing you could possibly do. We need that kind of a target.

Secondly, on this competitiveness issue, I think we need to recognize as a place for incentives—we need to recognize that it is a myth that developing countries are going to steal market share based on carbon. China is already acting in cement, steel, carbon paper and so on; and they will be more efficient than we are by the time 2020 rolls around. So that is not the issue. The issue is working together to get the level playing field.

Finally, on the EU, I want to submit for the record only 2 countries of the 15 are not meeting their targets on their own. Only Spain and Italy are not. And I can give you chapter and verse about why the new EU program is very aggressive and the trading system works.

The CHAIRMAN. Ms. Figueres.

Ms. FIGUERES. Thank you, Mr. Chairman.

Good news and bad news. The good news is that the new engagement of the developing countries actually opens up an unprecedented opportunity to rethink the structure, the logic and the potential of the future chapter of the climate change regime.

The bad news is we need to do this overnight. We are on an incredible tight time frame. We cannot afford to fail on this opportunity that is laid before us over the next 2 years. If within 2 years at the end of 2009 we don't have a global agreement that aggressively moves us forward, we will not be able to face our children and grandchildren.

The CHAIRMAN. Mr. Clapp.

Mr. CLAPP. Similar to what Ms. Figueres just said, this is our last agreement. This is our last shot. We have to have an international agreement that stops the growth of emissions and begins a pathway downward by 2020. If we don't get that agreement now, we will have missed the opportunity to get industry moving in that direction. So the catastrophic impacts will occur.

The second thing is I would hope that many of you would have the political courage to not become part of the bash China movement. China has been rather aggressive in its energy policies domestically, as we have heard today, and it is a country very different from United States. China's coastal population in the cities has a per capita income of about $1,200 a year. Fifty-seven percent of its population still lives on less than $5 a year. Whereas the United States per capita income is $42,000 a year. Our standard—of what is still one of the poorest countries in the world is rather slim.

The CHAIRMAN. Thank you, Mr. Clapp.

Mr. Meyer.

Mr. MEYER. Yes. Three points.

I think the message from Bali is clear. It is time for the United States not to talk the talk but walk the walk. If we continue to put a price of exactly zero on carbon pollution of the atmosphere, we are not going to be taken serious in this process. The more you can do to move domestic cap and trade legislation through the process, the sooner the U.S. is going to get on board with the rest of the world, the better our chances will be in negotiation.

Second, this is not just a risk, it is an opportunity. Keep your focus on the clean energy jobs that can be created, the new markets that can be created in helping the world solve this problems. I know Congressman Inslee has put forward some very bold ideas there. We need a revolution in this country. And there is an upside for dealing with this problem, not just a downside.

The third is the cost of achieving the deep cuts that we are talking about by 2050 are not zero, they are not minimal they are affordable. They are somewhere in the range of half to 1 percent of gross domestic output by the middle of the century. That is the equivalent of postponing tripling world output from 2050 to 2051. I think our descendants will say that is a pretty good deal.

On the other side, the costs of doing something are far lower than the costs of doing nothing. There is no scenario feasible where we can do nothing and have nothing happen in return. Estimates vary on what the ratio is there, but there is very, very little disagreement that the costs of inaction are much greater than the costs of dealing with this problem.

The CHAIRMAN. We thank you and each of the witnesses. This has been absolutely a fantastic panel. We thank each of you for giving us this preview of upcoming attractions in the United States Congress for the next year. I think global warming is about to be injected into the politics of the United States in a way that will match few other times for the next year, and with your help we have begun that today.

Thank you so much.

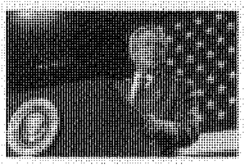
[Whereupon, at 1:57 p.m., the committee was adjourned.]

The Climate Change and Energy Security Challenge

Stephen D. Eule
U.S. Department of Energy

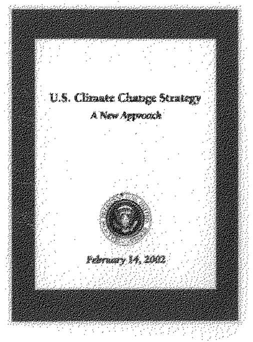
29 November 2007

U.S. Approach



I reaffirm America's commitment to the United Nations Framework Convention and its central goal, to stabilize atmospheric greenhouse gas concentrations at a level that will prevent dangerous human interference with the climate.

President George W. Bush
February 14, 2002



U.S. Climate Change Strategy
A New Approach

February 14, 2002

- U.S. approach to climate change harnesses the power of markets and technological innovation, maintains economic growth, and encourages global participation.
- Reaffirms U.S. commitment to goal of UNFCCC.
- Places climate change in a broader context that includes enhancing energy security, encouraging economic growth, and reducing air pollution.
- Five basic elements:
  - near-term policies & measures;
  - improved climate science;
  - advanced technologies;
  - international collaboration; and
  - finance.

U.S. National Initiatives Since 2001

$36 Billion Federal Climate Budget (FYs 2001 to 2007)

Incentives

- About $10 billion – EPAct 2005
- Clean Coal Investment Tax Credit ($1.6B + leveraging over $10B Private capital)
- Loan Guarantees (power and fuels)
- Up to $3400 Tax Credit for Efficient Vehicles
- Up to $4000 in Home Solar Incentives
- Biological Sequestration part of $40+ Billion 2002 Farm Bill Conservation Programs

Mandates

- Federal Fuel Economy (“CAFE”)
  - ✓ 15% Increase in Light Trucks Through 2011
- Federal Renewable Fuels (“RFS”)
  - ✓ 7.5 Billion Gallons By 2012
- Federal Appliance Efficiency
  - ✓ 40 Standards (15 From EPAct 2005)
- State Renewable Power (“RPS”)
  - ✓ 24 States; 80% of Generation
  - ✓ Going from 5.6GW, now 14.6GW, to 32GW
- Building Codes- Federal Facilities & States
  - ✓ DOE Model Code 30% Improvement

Technology

- Renewable Power: Advanced Solar and Wind
- Nuclear Power: Generation IV and Fusion
- Coal: Low Carbon Research; Future Gen Zero Emissions Coal & Hydrogen Power Plant; Regional Carbon Capture & Storage Program
- Fuels: Cellulosic Ethanol, Bio-Diesel, Hydrogen
- Vehicles: Plug-in Hybrids, Hydrogen Fuel Cell
- Zero Energy Home Research

Partnerships

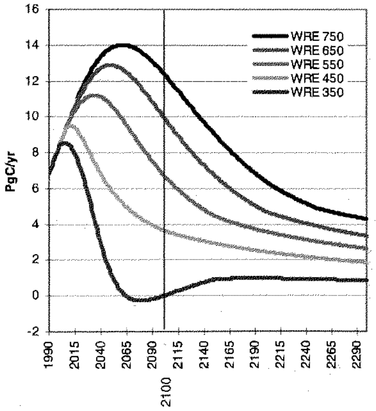
- Nuclear Power 2010
- Improved NRC Process for Nuclear Power
- Climate Vision (14 Industry Sectors)
- Climate Leaders (100+ Company Leaders)
- Smartway Transport Partnerships
- Energy Star and Natural Gas Star
- Federal Energy Management Programs

Technology Challenge

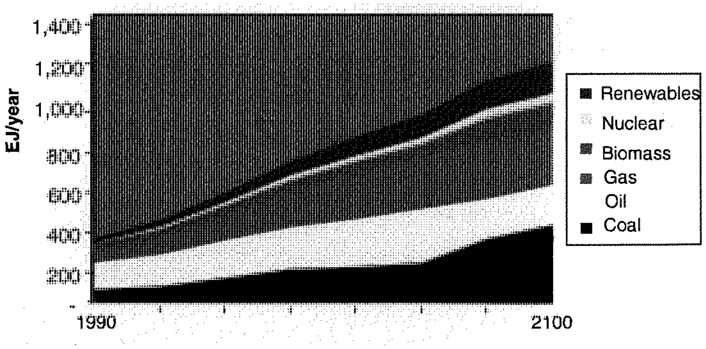
Climate Change Technology: Meeting the Long-Term Challenge

To provide the energy for continued economic growth and development while reducing greenhouse gas emissions, we will have to develop cost-effective technologies that transform the way we produce and use energy.

GHG Stabilization Curves

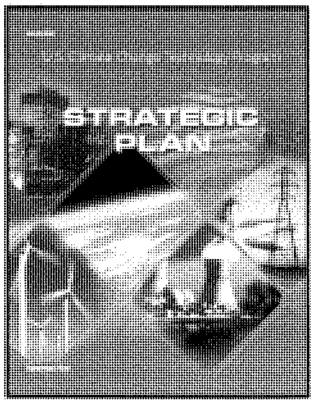


Projected World Primary Energy Demand, 1990-2100: A Reference Case Example



Technology: Seeking Better and More Cost-Effective Solutions

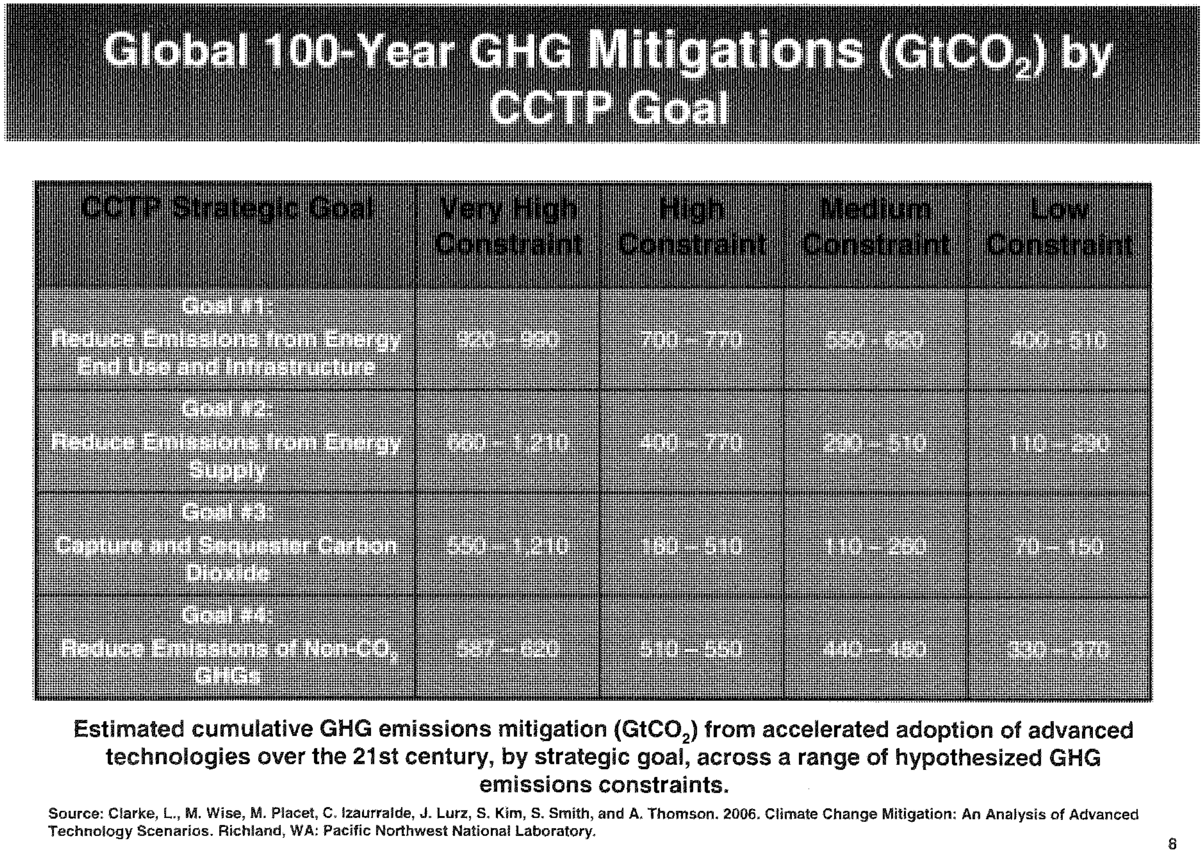
- U.S. Climate Change Technology Program
  - ✓ An ambitious program of RDD&D
  - ✓ $3.9 billion in FY08 budget request
- Climate Technology Goals:
  - ✓ Reduce emissions from energy end use & infrastructure;
  - ✓ Reduce emissions from energy supply;
  - ✓ Capture & sequester CO_2;
  - ✓ Reduce emissions from non-CO_2 gases;
  - ✓ Improve capabilities to measure & monitor GHGs; and
  - ✓ Bolster basic science
- CCTP authorized in *EPAct2005*.



www.climatetechnology.gov

Roadmap for Climate Change Technology Development

	NEAR-TERM	MID-TERM	LONG-TERM
GOAL #1 Energy End-Use & Infrastructure	• Hybrid & Plug-In Hybrid Electric Vehicles • Engineered Urban Designs • High-Performance Integrated Homes • High Efficiency Appliances • High Efficiency Boilers & Combustion Systems • High-Temperature Superconductivity Demonstrations	• Fuel Cell Vehicles and H_2 Fuels • Low Emission Aircraft • Solid-State Lighting • Ultra-Efficient HVACR • "Smart" Buildings • Transformational Technologies for Energy-Intensive Industries • Energy Storage for Load Leveling	• Widespread Use of Engineered Urban Designs & Regional Planning • Energy Managed Communities • Integration of Industrial Heat, Power, Process, and Techniques • Superconducting Transmission and Equipment
GOAL #2 Energy Supply	• IGCC Commercialization • Stationary H_2 Fuel Cells • Cost-Competitive Solar PV • Demonstrations of Cellulosic Ethanol • Distributed Electric Generation • Advanced Fission Reactor and Fuel Cycle Technology	• FutureGen Scale-Up • H_2 Co-Production from Coal/Biomass • Low Wind Speed Turbines • Advanced Biorefineries • Community-Scale Solar • Gen IV Nuclear Plants • Fusion Pilot Plant Demonstration	• Zero-Emission Fossil Energy • H_2 & Electric Economy • Widespread Renewable Energy • Bio-Inspired Energy & Fuels • Widespread Nuclear Power • Fusion Power Plants
GOAL #3 Capture, Storage & Sequestration	• CSLF & CSRP • Post Combustion Capture • Oxy-Fuel Combustion • Enhanced Hydrocarbon Recovery • Geologic Reservoir Characterization • Soils Conservation • Dilution of Direct Injected CO_2	• Geologic Storage Proven Safe • CO_2 Transport Infrastructure • Soils Uptake & Land Use • Ocean CO_2 Biological Impacts Addressed	• Track Record of Successful CO_2 Storage Experience • Large-Scale Sequestration • Carbon & CO_2 Based Products & Materials • Safe Long-Term Ocean Storage
GOAL #4 Other Gases	• Methane to Markets • Precision Agriculture • Advanced Refrigeration Technologies • PM Control Technologies for Vehicles	• Advanced Landfill Gas Utilization • Soil Microbial Processes • Substitutes for SF_6 • Catalysts That Reduce N_2O to Elemental Nitrogen in Diesel Engines	• Integrated Waste Management System with Automated Sorting, Processing & Recycle • Zero-Emission Agriculture • Solid-State Refrigeration/AC Systems
GOAL #5 Measure & Monitor	• Low-Cost Sensors and Communications	• Large Scale, Secure Data Storage System • Direct Measurement to Replace Proxies and Estimators	• Fully Operational Integrated MM Systems Architecture (Sensors, Indicators, Data Visualization and Storage, Models)

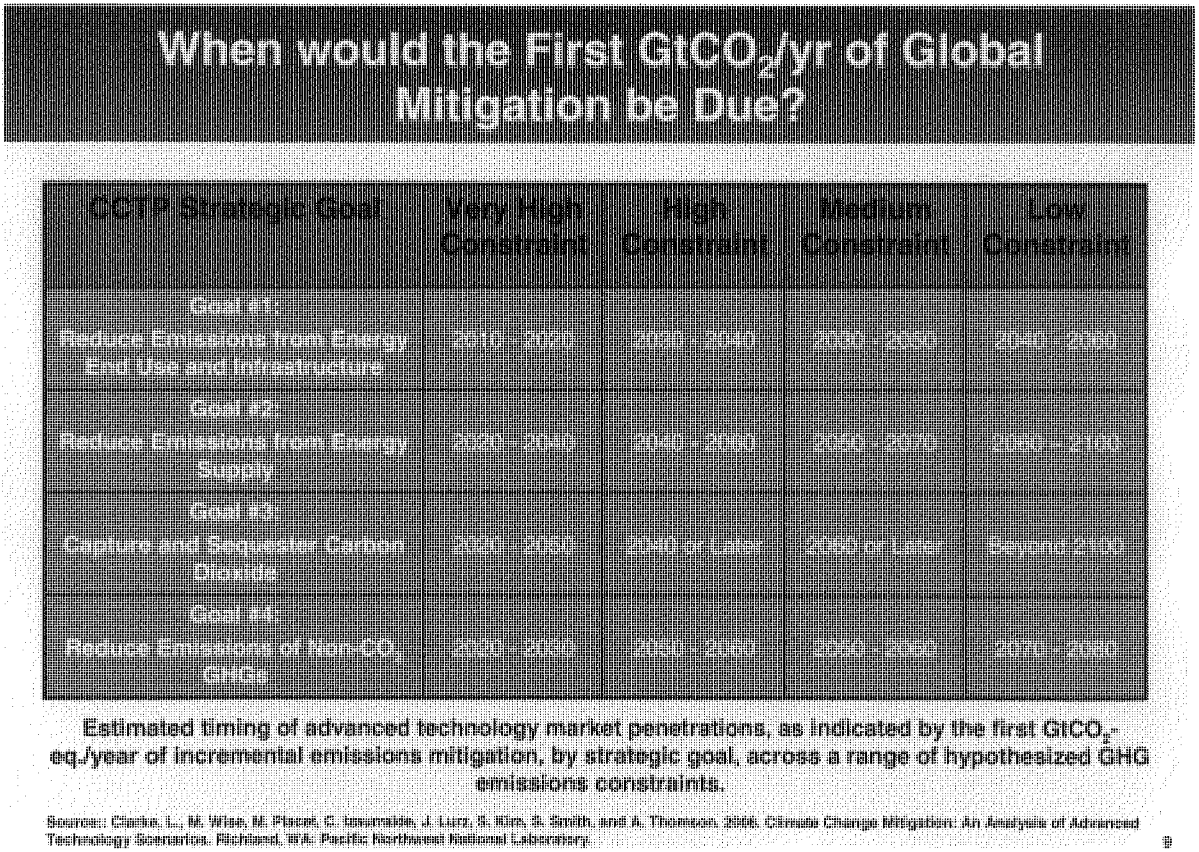


Global 100-Year GHG Mitigations ($GtCO_2$) by CCTP Goal

CCTP Strategic Goal	Very High Constraint	High Constraint	Medium Constraint	Low Constraint
Goal #1: Reduce Emissions from Energy End Use and Infrastructure	920 – 990	700 – 770	550 – 620	400 – 510
Goal #2: Reduce Emissions from Energy Supply	680 – 1,210	400 – 770	290 – 510	110 – 290
Goal #3: Capture and Sequester Carbon Dioxide	550 – 1,210	180 – 510	110 – 260	70 – 150
Goal #4: Reduce Emissions of Non-CO_2 GHGs	587 – 620	510 – 550	440 – 480	330 – 370

Estimated cumulative GHG emissions mitigation ($GtCO_2$) from accelerated adoption of advanced technologies over the 21st century, by strategic goal, across a range of hypothesized GHG emissions constraints.

Source: Clarke, L., M. Wise, M. Placet, C. Izaurralde, J. Lurz, S. Kim, S. Smith, and A. Thomson. 2006. Climate Change Mitigation: An Analysis of Advanced Technology Scenarios. Richland, WA: Pacific Northwest National Laboratory.



When would the First $GtCO_2$/yr of Global Mitigation be Due?

CCTP Strategic Goal	Very High Constraint	High Constraint	Medium Constraint	Low Constraint
Goal #1: Reduce Emissions from Energy End Use and Infrastructure	2010 - 2020	2030 - 2040	2030 - 2050	2040 - 2060
Goal #2: Reduce Emissions from Energy Supply	2020 - 2040	2040 - 2060	2050 - 2070	2050 - 2100
Goal #3: Capture and Sequester Carbon Dioxide	2020 - 2050	2040 or Later	2060 or Later	Beyond 2100
Goal #4: Reduce Emissions of Non-CO_2 GHGs	2020 - 2030	2030 - 2050	2050 - 2060	2070 - 2080

Estimated timing of advanced technology market penetrations, as indicated by the first $GtCO_2$-eq./year of incremental emissions mitigation, by strategic goal, across a range of hypothesized GHG emissions constraints.

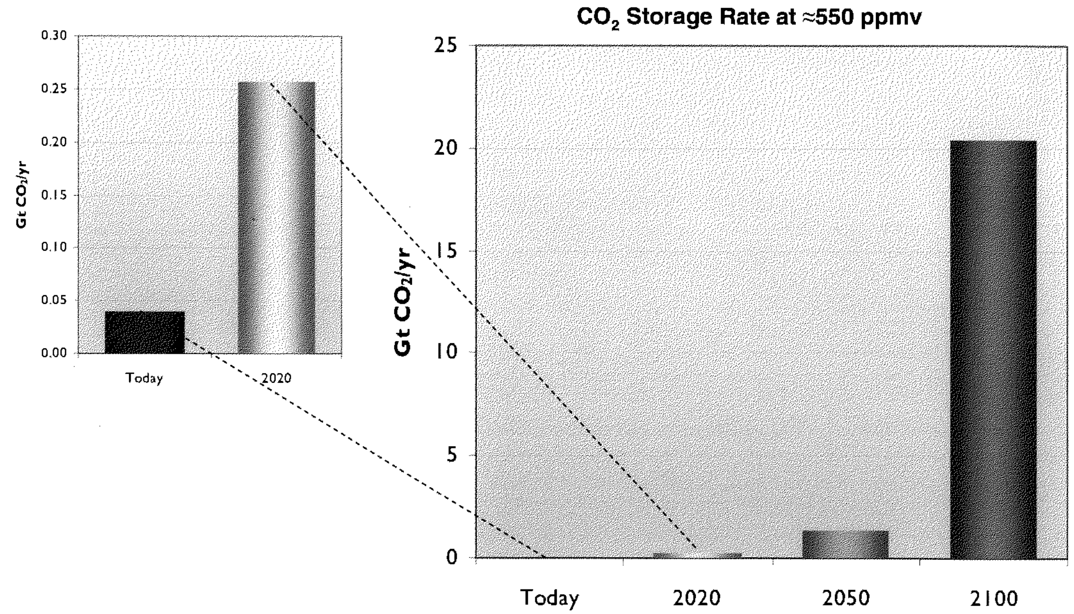
Source: Clarke, L., M. Wise, M. Placet, C. Izaurralde, J. Lurz, S. Kim, S. Smith, and A. Thomson. 2006. Climate Change Mitigation: An Analysis of Advanced Technology Scenarios. Richland, WA: Pacific Northwest National Laboratory.

How Big is One Gigaton* of CO_2?

Technology	Actions that Provide One Gigaton CO_2/ Year of Mitigation or Offsets
Coal-Fired Power Plants	Build 273 "zero-emission" 500 MW coal-fired power plants—Equivalent to about 7% of current global installed coal-fired generating capacity of 2 million MW.
Geologic Sequestration	Install 1,000 sequestration sites like Norway's Sleipner project (1 $MtCO_2$/year)—Only 3 sequestration projects of this scale exist today.
Nuclear	Build 136 new nuclear power plants of 1 GW each instead of new coal-fired power plants without CCS—Equivalent to about one third of existing worldwide nuclear capacity of 375 GW.
Efficiency	Deploy 273 million new cars at 40 miles per gallon (mpg) instead of 20 mpg (or at 14 km/L instead of 7 km/L).
Wind Energy	Install capacity to produce 14 times the current global wind generation capacity (about 74 GW) instead of new coal-fired power plants without CCS—Equivalent to more than 1 million 1 MW wind turbines.
Solar Photovoltaics	Install capacity to produce 273 times the current global solar PV generation instead of new coal-fired power plants without CCS.
Biomass Fuels from Plantations	Convert a barren area of about 4,800,000 km^2—Equivalent to about 2 times the size of the United Kingdom.
CO_2 Storage in New Forest	Convert a barren area of about 900,000 km^2—Equivalent to more that the size of Germany and France combined.

*Gigaton = 10^9 Metric Tons

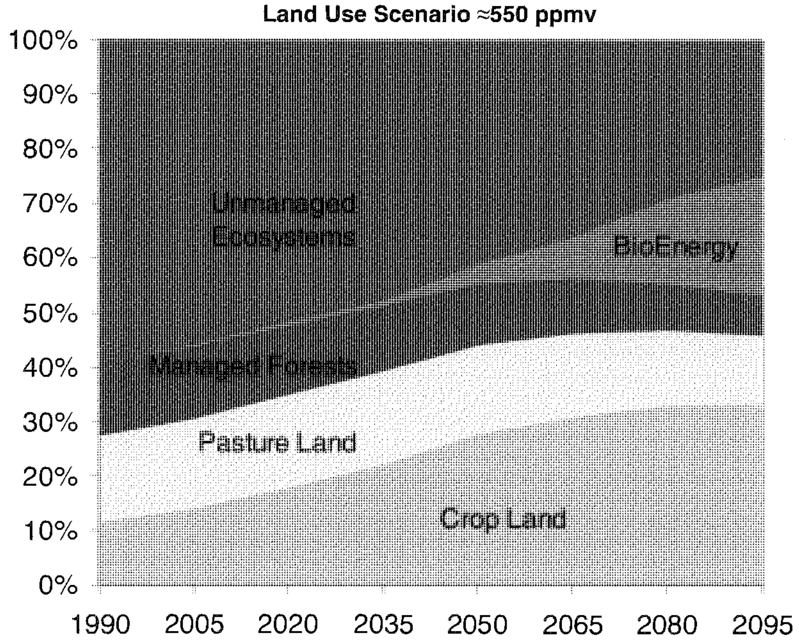
Scale of CO_2 Storage



CO_2 Storage Rate at ≈550 ppmv

Data derived from the Level 2 (approx 550 ppmv) MiniCAM CCSP scenario. See Clarke, L., J. Edmonds, H. Jacoby, H. Pitcher, J. Reilly, and R. Richels (2007a). *Scenarios of Greenhouse Gas Emissions and Atmospheric Concentrations.* Sub-report 2.1A of Synthesis and Assessment Product 2.1 by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. Washington, D.C.: U.S. Department of Energy, Office of Biological & Environmental Research.

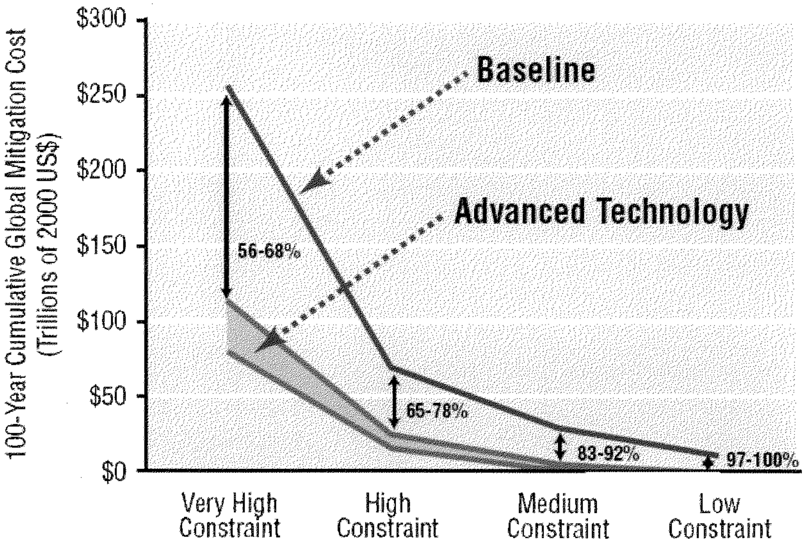
Scale of Biomass Land Area



From *Global Energy Technology Strategy, Addressing Climate Change: Phase 2 Findings from an International Public-Private Sponsored Research Program*, Battelle Memorial Institute, 2007. Land Use Scenario with 0.5% annual agricultural activity growth

Estimated 100-Year Potential Cost Reductions

Comparative analysis of estimated cumulative costs over the 21st century of GHG mitigation, with and without advanced technology, across a range of hypothesized GHG emissions constraints.



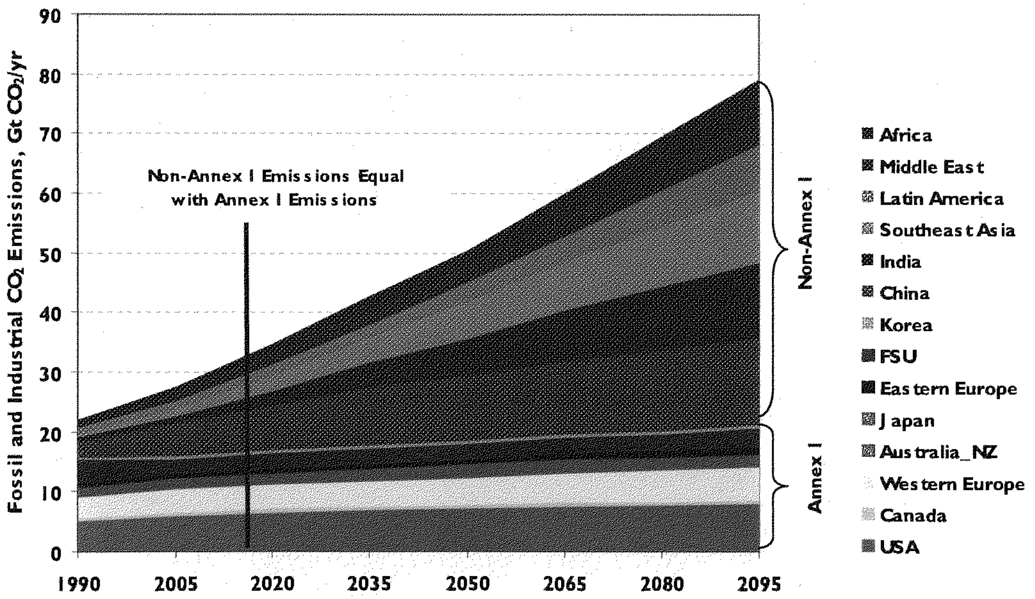
International Challenge

President Bush's New International Climate Change Framework

- The U.S. will work with other “Major Economies” to establish by the end of 2008 a new framework on GHG emissions for when the Kyoto Protocol expires in 2012.
- New framework will help meet responsibilities under the U.N. Framework Convention on Climate Change and lead to an international agreement by the end of 2009.
- Six Elements:
  1. A long-term aspirational global goal for GHG reduction, consistent with economic development & energy security objectives;
  2. National plans that advance the long-term global goal and that set mid-term goals that are effective and measurable, using a variety of binding, market-based, and voluntary measures;
  3. Collaborative technology development and deployment strategies for key sectors, including lower carbon fossil power generation, transportation, land use, and near zero carbon energy (e.g., efficiency, nuclear, wind, and solar);
  4. Improved entity-level measurement and accounting systems;
  5. Support accelerated adoption of clean technologies by innovative financing and lowering/elimination of tariffs and non-tariff barriers; and
  6. Robust programs to address adaptation, forestry, and technology access for all UN member states.

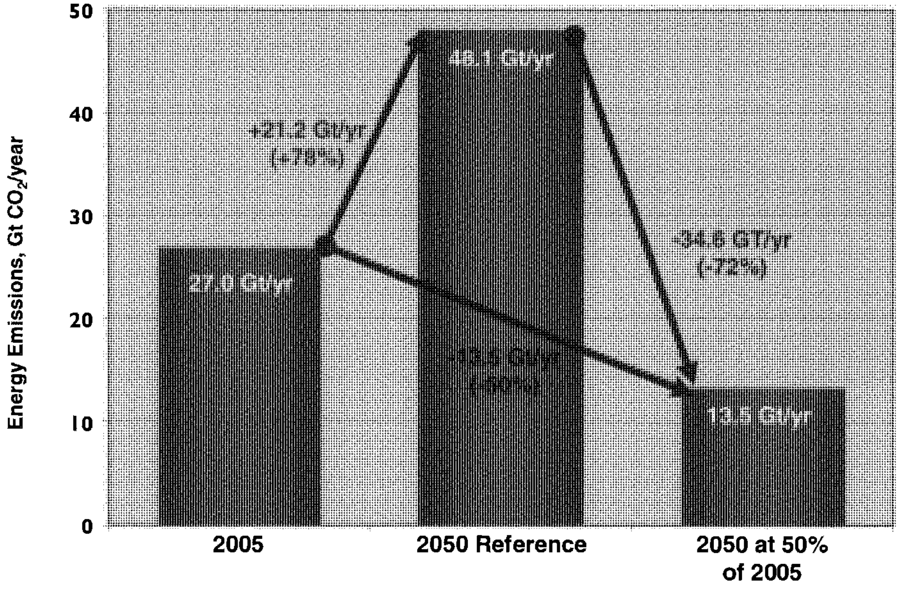
Important Transitions in Emitting Countries Over the Coming Century

Business-as-Usual CO_2 Emission Projections by Region



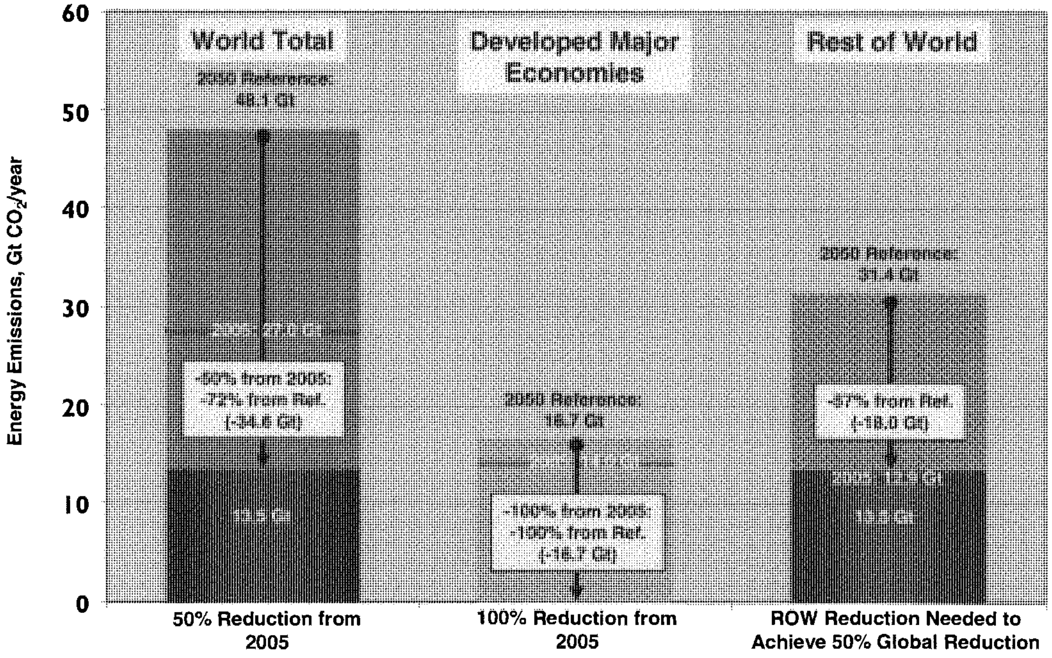
Data derived from *Global Energy Technology Strategy, Addressing Climate Change: Phase 2 Findings from an International Public-Private Sponsored Research Program*, Battelle Memorial Institute, 2007.

Global Energy CO_2 Emissions: 2005, 2050 Reference Case, and 2050 at 50% of 2005



Illustrative scenarios based on the CCSP MiniCAM reference scenario. Categories may not match exactly with other aggregations. Growth rates for the appropriate aggregate regions were used as proxies for growth rates in these individual countries. This is one illustrative scenario: other scenarios would have different emissions growth rates over the century. Results should be taken as illustrative of potential trends rather than as a best guess projection of the future.

Energy CO_2 Emissions Reductions Needed in 2050 to Achieve a 50% Reduction in Global Emissions Below 2005 if Developed ME Achieve a 100% Reduction: Annual Gigaton CO_2 Reduction and Percent Reduction from 2050 Reference*

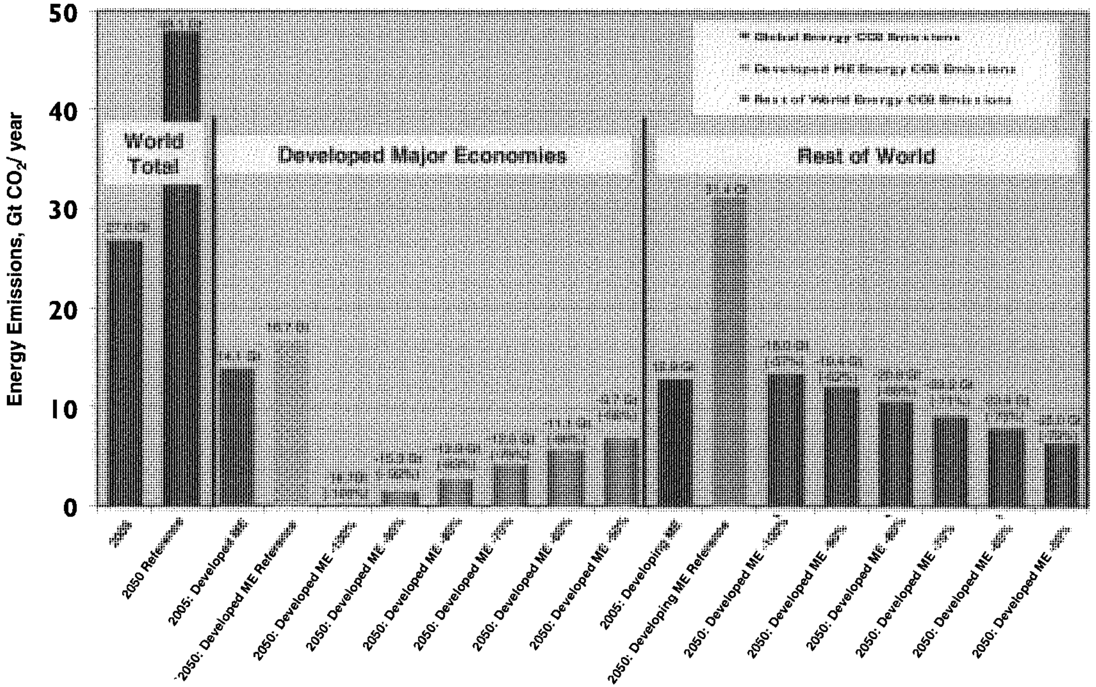


*Equals percent reduction from 2050 reference for that group (*i.e.*, developed or ROW). Developed MEs include: U.S., Europe, Russia, Japan, Canada, Korea, and Australia.

Comparative 2050 Energy CO_2 Emissions and Emissions Reductions Needed for Developed and "Rest of World" to Achieve in 2050 a Combined 50% Reduction in Emissions Below 2005 Under Different Reduction Goals (-100% to -50%) for Developed ME:

Annual Gigaton CO_2 Reduction from 2050 Reference

Percent Change from 2050 Reference*



*Equals percent reduction from 2050 reference for that group (*i.e.*, developed or ROW). Developed MEs include: U.S., Europe, Russia, Japan, Canada, Korea, and Australia.

U.S. Environmental Protection Agency
Office of Atmospheric Programs

EPA Analysis of Bingaman-Specter Request on Global CO_2 Concentrations

October 1, 2007

Request for EPA Analysis

- On July 26, 2007 Senators Bingaman and Specter requested that EPA estimate the economic impacts of the Low Carbon Economy Act of 2007 (S.1766).

- The request had two main parts:
  1) Analyze S.1766 in line with assumptions used for EPA's analysis of S.280 and other additional sensitivities. The results of this first request is to due to the Senators' offices by November 15, 2007.
  2) Evaluate CO_2 concentrations from:
     a) a historical perspective showing individual nation's and region's contributions to current concentrations; and
     b) a projections perspective showing the effects of the emissions targets of three bills:
        1. Lieberman-McCain, "Climate Stewardship and Innovation Act," (S.280),
        2. Kerry-Snowe, "Global Warming Reduction Act," (S.485),
        3. Bingaman-Specter, "Low Carbon Economy Act," (S.1766).

The work presented here is the response to the second part of the request, and thus does not Include an analysis of the costs or economic impacts of achieving the specified reductions.

- The analysis was conducted by EPA's
  Office of Atmospheric Programs.
  Contact: Francisco de la Chesnaye.
  Tel: 202-343-9010.
  Email: delachesnaye.francisco@epa.gov.

Key Results and Insights

Historic contributions to CO_2 Concentrations

- CO_2 from energy 1850 – 2000
  - Energy related CO_2 emissions from four regions (USA, EU, Commonwealth of Independent States, and China) contribute to 74% of the increase in CO_2 concentrations over the period 1850 – 2000.
  - Energy related CO_2 emissions from the rest of the world contributes to the remaining 26% of the increase in CO_2 concentrations in this period, with no individual country contributing more than 4%
- CO_2 from energy and land use change 1950 - 2000
  - When considering both energy related CO_2 emissions and emissions from land-use change over the more recent period of 1950 – 2000, the contribution to the increase in CO_2 concentrations is much more evenly shared.
  - USA, EU25, CIS, and China combined contribute to 55% of the increase in CO_2 concentrations.
  - Asia, Latin America, and Africa combined contribute to 30% of the increase in CO_2 concentrations.

Projected CO_2 concentrations and effects of the emissions targets of three climate bills

- The three bills achieve similar levels of cumulative GHG emissions abatement.
  - Bingaman-Specter assumptions:
    - The Technology Accelerator Payment (TAP) is not triggered.
    - 2050 targets of 60 percent below 2006 emissions levels are adopted.
- Compared to Lieberman-McCain (S. 280), Bingaman-Specter (S. 1766) requires a smaller percentage reduction of emissions in covered sectors, but since S. 1766 has broader coverage than S. 280, the total abatement achieved by both bills is similar.
- Given the assumption that international actions are the same, the three bills all have a nearly identical effect on CO_2 concentrations at the end of the century.

Scenarios

Reference Scenario

- Reference scenario emissions come from the Climate Change Science Program (CCSP) Synthesis and Assessment Product 2.1a MiniCAM reference case.
- The CCSP SAP 2.1a reference case assumes that in the post-2012 period existing measures to address climate change expire and are never renewed or replaced.

Scenarios Without International Action

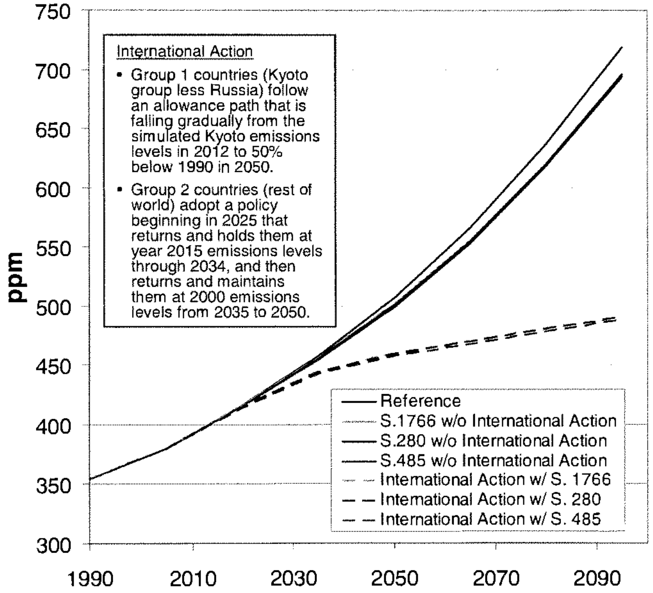
- USA adopts Bingaman-Specter (S. 1766) , Lieberman-McCain (S. 280), or Kerry-Snowe (S. 485).
- S. 1766 Assumptions:
  - The Technology Accelerator Payment (TAP) is not triggered.
  - 2050 targets of 60 percent below 2006 emissions levels are adopted.
- All other countries adopt no additional policies or measures.

Scenarios with International Action

- USA adopts S. 1766, S. 280, or S. 485.
- S. 1766 Assumptions:
  - The TAP is not triggered.
  - 2050 targets of 60 percent below 2006 emissions levels are adopted.
- Widespread international actions by developed and developing countries over the modeled time period. International policy assumptions are based on those used in the recent MIT report, “Assessment of U.S. Cap-and-Trade Proposals”
  - Group 1 countries (Kyoto group less Russia) follow an allowance path that is falling gradually from the simulated Kyoto emissions levels in 2012 to 50% below 1990 in 2050.
  - Group 2 countries (rest of world) adopt a policy beginning in 2025 that returns and holds them at year 2015 emissions levels through 2034, and then returns and maintains them at 2000 emissions levels from 2035 to 2050.
- After 2050, all countries hold emissions caps constant at 2050 levels.

The effects of the TAP, and the effects of trade and emissions leakage –analyzed in detail for the final legislative analysis– will be used to update this concentrations assessment if warranted.

Global CO_2 Concentrations (MiniCAM)



International Action

- Group 1 countries (Kyoto group less Russia) follow an allowance path that is falling gradually from the simulated Kyoto emissions levels in 2012 to 50% below 1990 in 2050.
- Group 2 countries (rest of world) adopt a policy beginning in 2025 that returns and holds them at year 2015 emissions levels through 2034, and then returns and maintains them at 2000 emissions levels from 2035 to 2050.

* Reference scenario emissions come from the Climate Change Science Program (CCSP) Synthesis and Assessment Product 2.1a MiniCAM reference case.

In the reference scenario,* Global CO2 concentrations rise from historical levels of 354 parts per million (ppm) in 1990 to 718 ppm in 2095.

Effect of S. 1766, S. 280, and S. 485

Assuming no one in the international community changes their current policies, the global CO_2 concentrations in 2095 are estimated as follows:

- If the U.S. adopts either S. 1766 or S.280, CO_2 concentrations in 2095 are estimated to be 23 ppm lower than the reference scenario, or 696 ppm.
- If the U.S. adopts S. 485, CO_2 concentrations in 2095 are estimated to be 25 ppm lower than the reference scenario, or 694 ppm.

Effect of International Action plus Senate Bills

Assuming the international community takes the actions described in the diagram to the left, the global CO2 concentrations in 2095 are estimated as follows:

- If the international community takes action and the U.S. adopts S. 1766 or S. 280, CO2 concentrations are reduced from 718 ppm to 491 ppm in 2095, to which the U.S. contributes a 23 ppm reduction.
- If the international community takes action and the U.S. adopts S. 485, CO2 concentrations are reduced from 718 ppm to 489 ppm in 2095, to which the U.S. contributes a 25 ppm reduction.
- While CO_2 concentrations are significantly reduced in the scenarios with international action, they are not on a stabilization trajectory.

The work presented here does not include an assessment of the costs or economic impacts associated with achieving the specified reductions. EPA is currently producing an analysis of the economic impacts of S. 1766 that is due to the Senators' offices by November 15, 2007. EPA's economic analysis of S. 280 is available at: www.epa.gov/climatechange/economicanalyses.html

Global CO_2 Concentrations (MiniCAM)

- The cumulative global GHG emissions reductions over the entire century are similar under all three bills.
  - Cumulative International GHG emissions reductions are assumed to be identical under all three bills (2443 bmt CO_2e over the 2005 – 2095 time period in scenarios with international action, 0 bmt CO_2e in scenarios without international action).
  - The cumulative U.S. GHG emissions reductions over the entire century under the three bills span a range of 45 bmt CO_2e.

U.S. Cumulative GHG Emissions Reductions (Billion Metric Tons CO_2e)

	2005 - 2050	2005 - 2095
S. 1766	87	326
S. 280	102	335
S. 485	126	371

- Cumulative U.S. GHG emissions reductions under S. 1766 are 87 bmt CO_2e over the 2005 – 2095 time period, and 326 bmt CO_2e over the 2005 – 2095 time period.
- Cumulative U.S. GHG emissions reductions under S. 280 are 102 bmt CO_2e over the 2005 – 2095 time period, and 335 bmt CO_2e over the 2005 – 2095 time period.
- Cumulative U.S. GHG emissions reductions under S. 1766 are 126 bmt CO_2e over the 2005 – 2095 time period, and 371 bmt CO_2e over the 2005 – 2095 time period.

- Since the variations in cumulative global GHG emissions reductions under the three bills are small, the variations in the resulting CO_2 concentrations are small.

Mini-Climate Assessment Model (MiniCAM)

- The MiniCAM is a highly aggregated integrated assessment model that focuses on the world's energy and agriculture systems, atmospheric concentrations of greenhouse gases (CO_2 and non-CO_2) and sulfur dioxide, and consequences regarding climate change and sea level rise.
- It has been updated many times since the early eighties to include additional technology options. MiniCAM is capable of incorporating carbon taxes and carbon constraints in conjunction with the numerous technology options including carbon capture and sequestration.
- The model has been exercised extensively to explore how the technology gap can be filled between a business-as-usual emissions future and an atmospheric stabilization scenario.
- The MiniCAM model is designed to assess various climate change policies and technology strategies for the globe over long time scales. It is configured as a partial equilibrium model that balances supply and demand for commodities such as oil, gas, coal, biomass and agricultural products.
- The model runs in 15-year time steps from 1990 to 2095 and includes 14 geographic regions.
- The model is developed and run at the Joint Global Change Research Institute, University of Maryland. Model Homepage: http://www.globalchange.umd.edu

PNNL-16932

Pacific Northwest
National Laboratory
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Stabilizing CO_2 Concentrations with Incomplete International Cooperation

J. Edmonds
L. Clarke
J. Lurz
M. Wise

October 2007

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

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Abstract

Many stabilization scenarios have examined the implications of stabilization on the assumption that all regions and all sectors of all of the world's economies undertake emissions mitigations wherever and whenever it is cheapest to do so. This idealized assumption is just one of many ways in which emissions mitigation actions could play out globally, but not necessarily the most likely. This paper explores the implications of generic policy regimes that lead to stabilization of CO_2 concentrations under conditions in which non-Annex 1 regions delay emissions reductions and in which carbon prices vary across participating regions. The resulting stabilization scenarios are contrasted with the idealized results. Delays in the date by which non-Annex I regions begin to reduce emissions raise the price of carbon in Annex I regions relative to the price of carbon in Annex I in an idealized regime for any given CO_2 concentration limit. This effect increases the longer the delay in non-Annex I accession, the lower the non-Annex 1 carbon prices relative to the Annex 1 prices, and the more stringent the stabilization level. The effect of delay is very pronounced when CO_2 concentrations are stabilized at 450 ppmv, however the effect is much less pronounced at 550 ppmv and above. For long delays in non-Annex I accession, 450 ppmv stabilization levels become infeasible.

131

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Contents

Abstract ... iii

Acknowledgements ... v

1.0 Introduction ... 1.1

2.0 The MiniCAM ... 2.1

3.0 Study Design ... 3.1

4.0 The Reference Scenario ... 4.1

5.0 Results ... 5.1

6.0 The Distribution of Costs Associated with Delayed Accession ... 6.1

7.0 Final Considerations ... 7.1

8.0 References ... 8.1

Figures

Figure 4.1. Global Population in the Reference Scenario 4.1
Figure 4.2. Global Economic Output in the Reference Scenario 4.2
Figure 4.3. Global Primary Energy Consumption 4.2
Figure 4.4. Global Fossil Fuel and Industrial Carbon Emissions by Region 2005 to 2095 .... 4.2
Figure 5.1. Set 1 Common Global Carbon Prices 5.2
Figure 5.2. Set 1 Emissions: Global, U.S., and India 5.2
Figure 5.3. Set 2 Global Carbon Prices 5.4
Figure 5.4. Set 2 Stabilization at 650 ppmv—Global, U.S., and India Emissions 5.4
Figure 5.5. Set 2 Stabilization at 550 ppmv—Global, U.S., and India Emissions 5.5
Figure 5.6. Set 2 Stabilization at 450 ppmv—Global, U.S., and India Emissions 5.5
Figure 5.7. Set 3 Regional Carbon Prices 650 ppmv – Annex 1 and India 5.6
Figure 5.8. Set 3 Regional Carbon Prices 550 ppmv – Annex 1 and India 5.6
Figure 5.9. Set 3 Regional Carbon Prices 450 ppmv – Annex 1 and India 5.7
Figure 5.10. Set 3 Stabilization at 650 ppmv—Global, U.S., and India Emissions 5.7
Figure 5.11. Set 3 Stabilization at 550 ppmv—Global, U.S., and India Emissions 5.8
Figure 5.12. Set 3 Stabilization at 450 ppmv—Global, U.S., and India Emissions 5.8

Tables

Table 3.1. Summary of Three Alternative Sets of Hypothetical Policy Regimes 3.2
Table 6.1. Percentage Increase in Total Social Cost of Stabilization at Alternative Levels of Atmospheric CO_2 Relative to First Best 6.1
Table 6.2. Fraction of Total Social Cost of Stabilization at Alternative Levels of Atmospheric CO_2 Borne by Non-Annex 1 Regions 6.2

1.0 Introduction

Ultimately, the atmospheric concentration of CO_2 must be stabilized to limit climate change. To understand the energy, economic, emissions, and other implications of stabilization, researchers have been creating economic, computer-based global stabilization scenarios for over two decades (see, for example, Edmonds and Reilly, 1985). Traditionally, these stabilization scenarios have examined the implications of stabilizing greenhouse gas concentrations under the first-best assumptions of perfect "where" and "when" flexibility; that is, all regions of the world and all sectors of all of the world's economies undertake emissions reductions wherever and whenever it is cheapest to do so (see, for example, IPCC 2001 and Clarke et al., 2007a). Examination of the first-best policy scenario is attractive because it is unique and well defined. However, it is unlikely that the world will undertake to address climate change in such a cooperative fashion, and it is therefore important to understand the characteristics and ramifications of non-idealized policy regimes.

One characteristic of the first-best regime is that it minimizes the economic costs of stabilization. To the extent the real world deviates from the first-best world, the global cost of stabilization will be higher. This raises several questions of relevance to the international policy-making process. How much higher are costs under inefficient policies? Which inefficiencies have the largest impacts? What are the regional impacts on mitigation actions and carbon prices? How do these inefficiencies interact with stabilization goals? Unfortunately, there are an infinite number of non-idealized policy regimes, leaving researchers interested in these questions with the difficult task of identifying realistic and meaningful non-idealized policy scenarios for examination.

This paper examines scenarios that stabilize the CO_2 concentration at three different levels under generic assumptions that limit "where" and "when" flexibility. This approach contrasts to an alternative approach that considers alternative hypothetical protocols that prescribe emissions mitigation behavior without regard to a particular atmospheric end-state. This approach has been used in a variety of earlier studies, including Richels et al. (1996), Edmonds and Wise (1998), and modeling analyses of the Kyoto Protocol conducted through the Energy Modeling Forum 16 study (Weyant and Hill, 1999). This latter approach can be used to consider options that are under discussion regardless of where these discussions ultimately lead. In contrast, by adding a limit on CO_2 concentrations, this paper puts the resulting scenarios on a common footing with respect to the atmospheric end states.

Two types of generic inefficiencies are considered in this paper: (1) inefficiencies in "when" flexibility, namely the year in which regions begin emissions reductions (the date of accession), and (2) inefficiencies in "where" flexibility, namely the degree to which marginal costs of emissions reductions vary across regions that are undertaking emissions reductions. This paper does not consider inefficiencies in emissions mitigation within regions; that topic is reserved for future research.

This paper considers only the implications for emissions mitigation. It does NOT explore the larger issue of stabilization benefits. Clearly, emissions mitigation would not be undertaken without a belief the benefits were at least as large as the costs, and ideally that the marginal benefits from additional mitigation were approximately as large as the marginal costs of emissions mitigation. Therefore, this paper develops only part of the information needed for a region or international community to develop a climate policy. It is important to emphasize this study is not a cost-benefit analysis; rather, it is a cost-effectiveness analysis.

The remainder of the paper proceeds as follows. Section 2 describes the MiniCAM modeling framework employed in this analysis. Section 3 outlines the three sets of hypothetical and generic international emissions mitigation regimes that are explored for three different concentrations of atmospheric CO_2: 450 ppmv, 550 ppmv, and 650 ppmv. Section 4 then describes the reference case which serves as a backdrop against which the stabilization scenarios occurs. Idealized stabilization scenarios assuming first-best policies, i.e. perfect "where" and "when" flexibility, are discussed in Section 5. Carbon prices and emissions reductions at both global and regional levels are discussed. Section 6 explores the impact of inefficiencies on global and regional costs of stabilization and global and regional emissions pathways in more detail. Discussion and conclusions are provided in Section 7.

2.0 The MiniCAM

The analysis in this paper was conducted using the MiniCAM integrated assessment model. MiniCAM (Brenkert et al. 2003, Kim, et al. 2006)) combines a technologically detailed global energy-economy-agricultural-land-use model with a suite of coupled gas-cycle, climate, and ice-melt models, integrated in the Model for the Assessment of Greenhouse-Gas Induced Climate Change (MAGICC).

The MiniCAM is a direct descendent of a model developed by Edmonds and Reilly (1985). MiniCAM was developed and is maintained at the Joint Global Change Research Institute, a partnership between the Pacific Northwest National Laboratory (PNNL) and the University of Maryland, while MAGICC was developed and is maintained at the National Center for Atmospheric Research (NCAR). MiniCAM is a global model disaggregated into 14 geopolitical regions. It is solved on a 15-year time step.

MiniCAM has been used extensively for energy, climate, and other environmental analyses conducted for organizations that include the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency, the Intergovernmental Panel on Climate Change (IPCC), and other government, private and non-governmental organizations. The MiniCAM is designed to examine long-term, large-scale changes in global and regional energy systems, focusing on the impact of energy technologies. Documentation for MiniCAM can be found at http://www.globalchange.umd.edu/models/MiniCAM.pdf/.

The scenarios in this paper were conducted using the version of MiniCAM that participated in the U.S. Climate Change Science Program's (CCSP) scenarios of greenhouse gas emissions and concentrations (Clarke, et al. 2007a). Extensive documentation of the assumptions for the models can be found in that document as well as in Clarke et al. (2007b). The reference and stabilization scenarios in this paper vary in one important way from the MiniCAM CCSP scenarios. In those scenarios, the terrestrial carbon cycle interacts with the agriculture and land-use behavior. In this paper, net uptake by terrestrial ecosystems is prescribed. This change was made to simplify the computational environment and to focus on the role of energy and industrial CO_2 emissions.

3.0 Study Design

This paper explores the stabilization of atmospheric CO_2 concentrations at three alternative levels: 450 ppmv, 550 ppmv, and 650 ppmv. These three stabilization levels are of interest in that they all require significant emissions reductions over the coming century. Each of these was considered against three alternative policy backgrounds denoted as Sets 1, 2, and 3. In all of the stabilization scenarios, emissions are limited in such a way that the concentration of CO_2 never exceeds the prescribed level.[1]

In all instances, emissions mitigation in each region is achieved through the imposition of a domestic price placed on carbon emissions. It would, alternatively, have been possible to construct hypothesized cap-and-trade international policy structures that would yield essentially the same carbon prices and international distributions of emissions mitigation. However, cap-and-trade regimes require that a distribution of emissions rights be prescribed. Those emissions rights do not affect the emissions mitigation undertaken in each region, assuming minimal transactions costs, but they do create a set of income transfers. Those income transfers depend completely on the emissions distributions. Researchers have explored the implications of alternative regimes in earlier work (see, for example, Edmonds et al. 1993a, 1993b; Rose et al. 1998). The implications of alternative emissions-permit allocations are not the focus of this paper.

The characteristics of the three alternative hypothetical policy regimes, namely Sets 1, 2, and 3, that considered in this paper are summarized in Table 3.1 and described below. Each set of scenarios is assigned a name given in Table 3.1.

Set 1: First-Best Scenarios. This is the simplest of the hypothetical protocol sets, assuming perfect "where" and "when" flexibility. It serves as a benchmark for exploring the deviations from efficiency explored in Set 2 and Set 3. All regions of the world begin a common program of emissions mitigation in 2012[2], applying a common carbon price to all CO_2 emissions in all sectors of their economies: no emissions are exempt.[3]

The price of carbon over time follows a Hotelling-Peck-Wan (HPW) price path[4]. The HPW path is a global, present-discounted-cost-minimizing price path. It has two parts. Along the first part of the path, the price of carbon rises at the rate of interest, plus the in-year average rate of removal of carbon from the atmosphere by ocean and terrestrial carbon sinks.[5] Therefore, there is an initial price in the first year of emissions mitigation, 2013, which rises exponentially thereafter. The price of carbon is thus initially low, but doubles at a regular rate until the concentration of CO_2 reaches the concentration limit. Along any HPW pathway, a decision maker in any period sees the discounted marginal cost of reducing a ton of carbon in the present and future as equal. Therefore, if the initial price of carbon is known, then all subsequent carbon prices are uniquely determined until the concentration of CO_2 reaches the ceiling. Note that because the carbon cycle removes some portion of any emissions in the present period by the second period, the rate of price rise must be adjusted upward at the removal rate to compare tons of carbon across time.

---

[1] That is, this paper does not consider "overshoot" scenarios in which the concentration of CO_2 temporarily passes above the target level and later declines to a lower final stabilization level. For example, see Kheshgi et al. (2005) or Wigley et al. (2006). The maximum cumulative emissions over 1000 years for any ultimate stabilization level were calculated by Kheshgi et al. (2005). A fuller exploration of the "overshoot" scenarios will be taken up in future work.

[2] Prior to 2012, it is assumed that present policy commitments are successfully implemented. That is, it is assumed that the Kyoto Protocol is implemented by member nations. Similarly, it is assumed that commitments on the part of the U.S. and other regions are also successfully implemented.

[3] Note again that this paper assumes that terrestrial emissions from land use and land-use change remain constant.

[4] See Peck and Wan (1996), which elaborates on the original approach developed by Hotelling (1931).

[5] Note that an average rate of ocean and terrestrial uptake over time was used in these scenarios. In reality, the ocean-atmosphere-terrestrial biosphere system is dynamic, so the rate of uptake varies over time and between scenarios.

Table 3.1. Summary of Three Alternative Sets of Hypothetical Policy Regimes

	Hypothetical Policy Regimes		
Name	**Set 1** **First-Best**	**Set 2** **Graduated Accession**	**Set 3** **Heterogeneous Regimes**
CO_2 Stabilization Concentrations	450, 550, 650 ppmv		
Participation	All regions participate beginning in 2012.	All Annex I regions join in 2012. Non-Annex I regions enter the international system with the wealthiest joining in 2020, 2035 or 2050 (three sub-cases). Other non-Annex I nations enter when their per-capita income reaches the level of the first participating region when it joined the regime.	Same as in Set 2.
Regional Carbon Price	Follows a globally common HPW path.	Globally common for all participating regions; follows a HPW path, but only participating regions charge for emissions.	A common price path for the initial coalition; each late entrant follows a unique price path, based on their per-capita income relative to a benchmark per-capita income, leading eventually to the global price.
HPW = Hotelling-Peck-Wan.			

When the concentration of CO_2 reaches the limit, the price is no longer set by the exponential growth path. At this point, there is a transition to a price path determined by the physical characteristics of the carbon cycle. The physical uptake of terrestrial and ocean carbon reservoirs govern allowable emissions. Global emissions are thereafter controlled so that the concentration of CO_2 is held constant at the limit. The price of carbon is set so that allowable emissions are exactly equal to carbon uptake by terrestrial and ocean reservoirs.

The initial price is set such that the exponentially rising price path and the physically constrained price path are continuous at the point of transition. That is, there are no ways of reducing total costs by shifting emissions mitigation between the exponentially growing price regime and concentration maintenance regime by arbitraging at the transition point. The HPW carbon price path defines a cost minimizing emissions mitigation pathway for any CO_2 stabilization concentration.

The economically efficient carbon price today is irrevocably linked to expectations about future technology availability and emissions mitigation. For any CO_2 concentration, pessimistic expectations about humanity's ability to mitigate carbon emissions in the far future would be reflected in a higher price of carbon and larger emissions reductions today. Conversely, optimistic expectations about humanity's ability to mitigate carbon emissions in the far future would be reflected in lower carbon prices and less aggressive emissions reductions today. This link between present and future holds at any point of time across the entire course of the stabilization regime. Thus, as information is acquired about the degree of difficulty in achieving emissions mitigation over time, and as expectations about the future are revised, so too must the then current price. Increasing optimism about future costs of emissions mitigation would reduce the then current price of carbon and increasing pessimism would have the opposite effect.

Set 2, the Graduated Accession Stabilization Set, examines the implications of delayed accession to a global regime by non-Annex I regions. This set of scenarios is consistent with the United Nations Framework Convention on Climate Change (United Nations, 1992), which establishes common but differentiated responsibilities for developed and developing countries. Set 2 is similar to the first-best scenarios in that there is a single carbon price, beginning in 2012, for all regions undertaking emissions reductions. The carbon price is assumed to rise at the HPW rate, with an initial price set so that the price time-path is continuous at the moment in time when the atmospheric concentration of CO_2 reaches the steady-state value.

The inefficiency occurs because not all regions begin emissions reductions in 2012. Non-Annex I nations join the coalition based on the date of accession of China, whose accession is set by hypothesis to be either the year 2020, 2035, or 2050. Other regions join in the period in which their per capita income level is at least a great as China's at its accession. This allows examination of the implication of later accession of non-Annex I nations on Annex I nations.

The scenario can be viewed as consisting of a single coalition of mitigating countries that begins emissions mitigation in 2012 and grows over time, and in which all of the coalition's members share a common carbon price. Hence, perfect "where" flexibility is achieved, but only within the coalition. As more and more regions join the Set 2 coalition, the closer the coalition approaches perfect "where" flexibility globally. Until the final region joins the coalition, the world as a whole does not practice perfect "where" flexibility. However, the Set 2 coalition can never achieve perfect "when" flexibility as the coalition was fragmented at its inception. As will be discussed later, the longer the delay in accession, the higher the price of carbon in the coalition and the greater the economic shock to the region upon accession.

Set 3, the Heterogeneous Regimes Stabilization Set, is similar to Set 2 in that regions join the coalition of emissions mitigating regions based on the assumed accession date for China and on their per capita income relative to China's when it enters the coalition. Set 3 differs from Set 2 in that not all coalition members impose a common carbon price. The initial entrants to the coalition—the Annex I countries—all see a common carbon price. The carbon prices in the late entrants differ, at least initially, from the global price and vary among regions. The carbon price for late entrants relative to the Annex I price is determined by the ratio of each late entrant's per-capita income to the U.S. per-capita income in the first year that China joins the coalition. Hence, each late entrant sees a carbon price that gradually converges to the global level as their per-capita income converges to the benchmark per-capita income.

Thus, as with Set 2, the coalition can never reach perfect "when" flexibility as the coalition was fragmented at its inception. Further, because some regions do not reach the benchmark per-capita income in the twenty-first century, the world does not achieve perfect "where" flexibility until sometime in the twenty-second century. However, within each region perfect "where" flexibility is assumed to exist.

4.0 The Reference Scenario

The reference scenario for this paper is described in detail in Clarke et al. (2007a and 2007b). Although production from non-emitting energy sources such as nuclear power, bioenergy, and other renewable energy sources increases over the century, this does not forestall increased consumption of fossil fuels and associated CO_2 emissions. The scenario is characterized by a transition in population, economic output, and CO_2 emissions from the Annex 1 to the non-Annex I regions (Figure 4.1, Figure 4.2, and Figure 4.4). This transition has strong implications for the effects of delayed action on the part of these countries. Clearly, carbon regimes will be most effective if the largest emitters are included in the coalition of countries reducing their emissions.

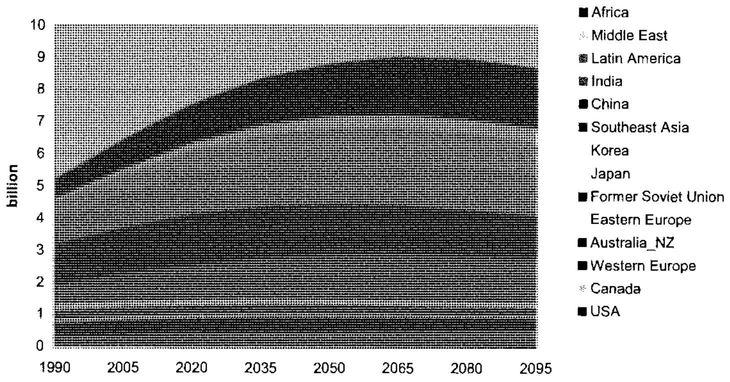

Figure 4.1. Global Population in the Reference Scenario

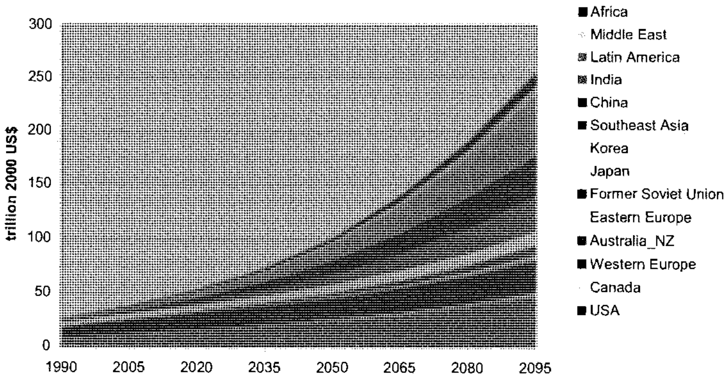

Figure 4.2. Global Economic Output in the Reference Scenario

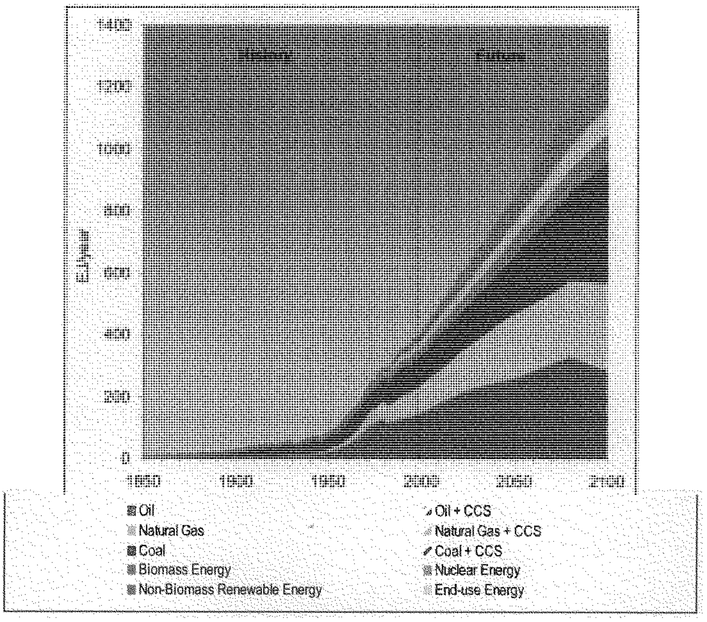

Figure 4.3. Global Primary Energy Consumption

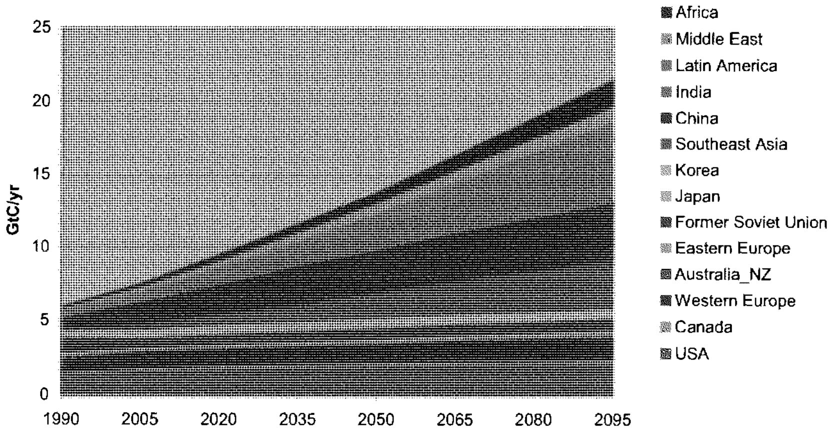

Figure 4.4. Global Fossil Fuel and Industrial Carbon Emissions by Region 2005 to 2095

5.0 Results

This section discusses the results from the three hypothetical stabilization regimes. Results are presented and discussed for the world, the U.S., and India. The U.S. and India are highlighted not because they are more important than other regions of the world, but they are exemplars of the differential impact of the hypothetical protocols.

Set 1: The First-Best Stabilization Set. Although all three first-best scenarios lead to stabilization in the long run, only the 450 ppmv scenario reaches stabilization this century. The 450 ppmv scenario reaches stabilization by 2065, at which point emissions, roughly level out and the carbon price is determined by the allowable emissions for maintaining the 450 ppmv limit (Figure 5.1). Stabilization is not reached until after 2095 for the 550 ppmv and 650 ppmv scenarios, so carbon prices continue to rise exponentially through 2095.

Because stabilization occurs sooner for the 450 ppmv stabilization level, there is less flexibility to distribute emissions reductions over time. The ramification of this lack of flexibility is more aggressive emissions reductions and higher carbon prices in the near term (Figure 5.1). Global emissions begin to decline immediately in the 450 ppmv scenario, whereas global emissions do not begin to decline until after 2050 in the 550 ppmv scenario and after 2065 in the 650 ppmv scenario: emissions track more closely to the reference emissions in the two less stringent scenarios. The price of carbon is a factor of five or more times higher for the 450 ppmv scenario than for the other two first-best stabilization limits. This lack of flexibility will exert a strong influence on the emissions and cost effects of the inefficient policies in Set 2 and Set 3. Delays in emission reductions in the non-Annex 1 countries will have proportionally larger impacts on costs and emissions reductions in the 450 ppmv scenario.

Uniform carbon prices do not imply uniform emissions trajectories, because regions vary in a range of factors that influence the growth in their reference emissions and their opportunities for emissions reductions. If countries such as India and China grow more quickly than the global average, as is the case in these scenarios, then the growth in both their reference emissions and their emissions under stabilization will be higher than the global average as well as developed countries such as the U.S. Hence, emissions decline more quickly in the U.S. than in India across the first-best stabilization scenarios. For example, U.S. emissions decline immediately in the 450 ppmv scenario, whereas Indian emissions continue to grow through 2035.

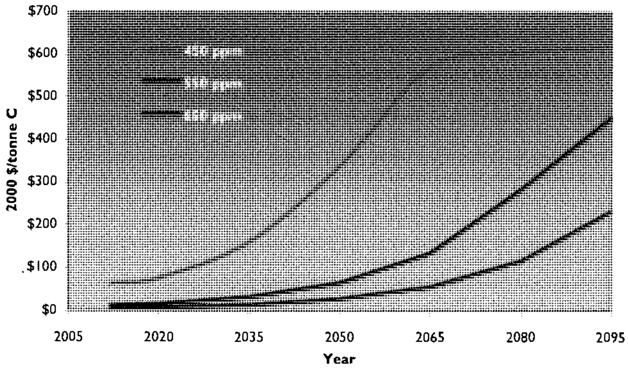

Figure 5.1. Set 1 Common Global Carbon Prices

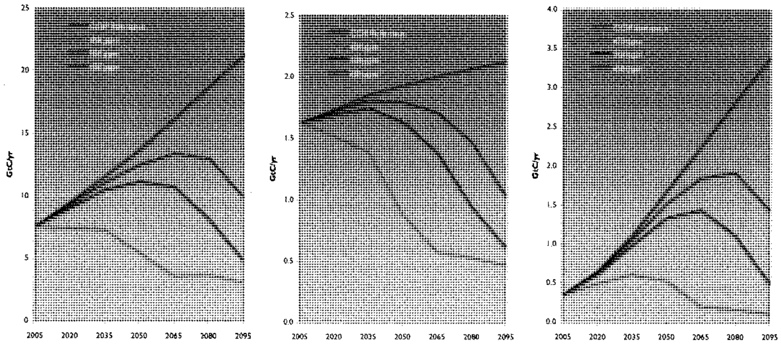

Figure 5.2. Set 1 Emissions: Global, U.S., and India

Set 2: Graduated Accession.

The effect of delaying the entry of non-Annex 1 countries into the coalition depends crucially on the concentration at which CO_2 is stabilized (Figure 5.3 through Figure 5.6). Delays to the year 2020 have only modest impact on the price of carbon that mitigating regions apply to CO_2 emissions. If the limit on the concentration of CO_2 is 650 ppmv, delays, even to mid-century, result in an increase of about 50 percent relative to first-best prices, which assume perfect "where" and "when" flexibility. That same delay roughly doubles the price of carbon when the CO_2 concentration is limited to 550 ppmv. When the CO_2 concentration is limited to 450 ppmv, a delay in non-Annex I region accession until the year 2050 renders the limit infeasible. Delays in non-Annex I accession – even to 2035 – lead to a carbon price that spikes at more than $2500 per ton of carbon before declining subsequent to the entry of the largest emitting non-Annex I regions. However, that price spike assumes long-term flexibility is available in the short term. As discussed below, U.S. carbon emissions are reduced by approximately half by 2020, which dramatically alters the result under first-best policy conditions, where U.S. emissions declined by approximately half in 2050. At a global level, the effect of delayed accession is to raise peak emissions somewhat and to reduce emissions more rapidly at the end of the century, though the increase in peak emissions is less than 15 percent in all instances.

Delays in accession of the non-Annex 1 countries put greater pressure on the Annex 1 countries for near-term emissions than under first-best conditions. The severity of the effect depends on the stabilization concentration of CO_2. At a concentration of 650 ppmv, the effects are relatively modest. They are more pronounced in the Set 2 550 ppmv stabilization scenarios. The effect is much larger when the concentration is 450 ppmv. The physical limits imposed by the carbon cycle are so strict for the 450 ppmv case that annual global emissions are almost identical in the first-best and Set 2 cases. That means that if a region undertook emissions mitigation in the first-best 450 ppmv case, and does not in a Set 2 case, those first-best emissions mitigations must be made up in Set 2 by participating regions roughly in the first half of the century. This is seen in stark perspective in the Set 2 450 ppmv limit with delays in accession to 2035. In this instance, the U.S. emissions are forced to decline by more than 70 percent relative to the reference by 2020. For the 550 ppmv and 650 ppmv cases, some emissions mitigation is shifted out in time, cushioning the incremental burden on participating regions.

The structure of the regime, i.e., a common emissions mitigation group with a common carbon price (e.g., the Kyoto Protocol), leads to a "carbon price shock" for regions entering the regime late. In this study, delayed accession causes India's emissions to drop precipitously once it joins the coalition. The price of carbon is common and rises with time. The longer India remains outside the coalition, the higher the price rises. As a consequence, India's economy does not experience a gradual, steady increase in the price of carbon. In fact, regions outside the control regime experience declining fossil-fuel prices and therefore have an incentive to increase fossil-fuel use relative to the reference case and therefore have somewhat higher emissions. Thus, late-entering parties experience decades of carbon price increases instantaneously. As a consequence, India's economy experiences the "carbon price shock," which in turn leads to precipitous emissions decline. The long-term nature of the MiniCAM model means that the full economic impact of the price shock is under reported, although it should be noted that the greater India's preparations are for this shock, the effect of the shock will be lower. Nonetheless, the degree of shock experienced is significant and again points to problems in a regime witb this characteristic.

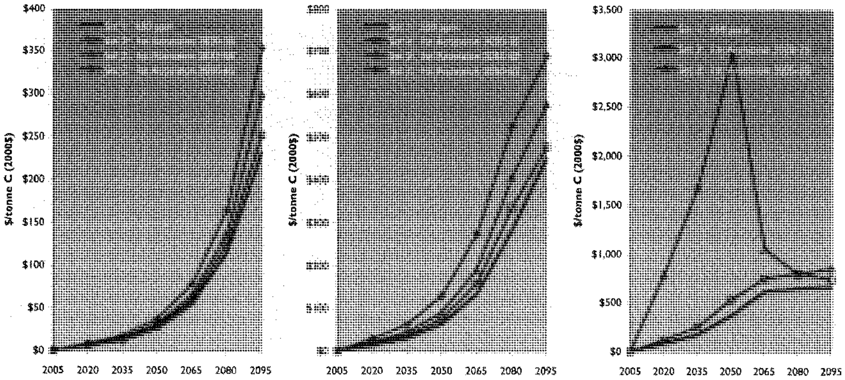

Figure 5.3. Set 2 Global Carbon Prices

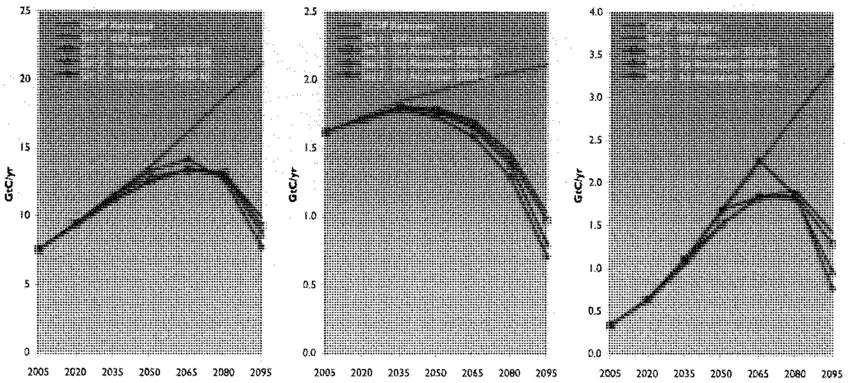

Figure 5.4. Set 2 Stabilization at 650 ppmv—Global, U.S., and India Emissions

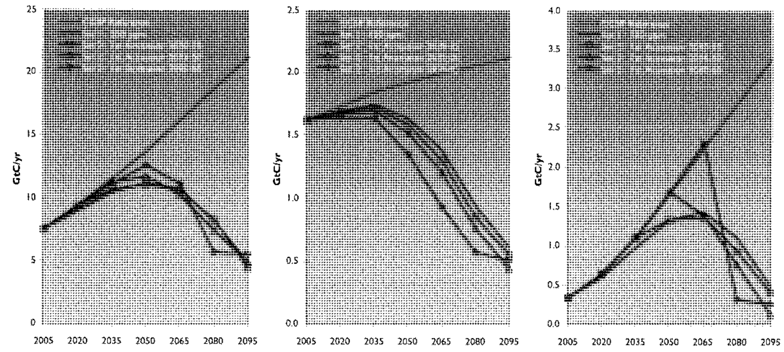

Figure 5.5. Set 2 Stabilization at 550 ppmv—Global, U.S., and India Emissions

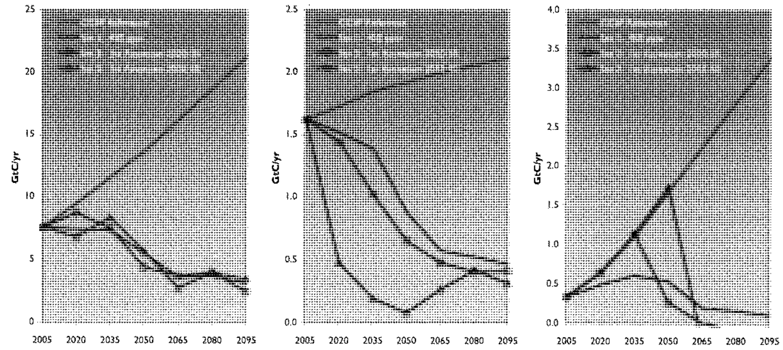

Figure 5.6. Set 2 Stabilization at 450 ppmv—Global, U.S., and India Emissions

Set 3: Heterogeneous Regimes. Accession need not imply a common value of carbon at the point of initial entrance into the coalition of regions taking mitigation actions. Set 3 explores the implication of a regime in which the Annex I countries see a common carbon price that follows a HPW structure, but one in which the carbon price trajectory for each late entrant is unique and lower than the Annex I coalition price. This regime is less efficient than Set 2 from the perspective of "when" and "where" flexibilities; however, it avoids the shock associated with later accession to an emissions mitigation regime whose price has risen substantially relative to its initial level.

The structure of the hypothesized heterogeneous regime is such that the U.S. carbon price is always above the first-best price and India's carbon price remains below the first-best price until late in the century (Figure 5.7 through Figure 5.9). Furthermore, the price of carbon in the U.S. is dramatically higher than in the first-best scenarios reaching more than $1000 per ton by the end of the century when CO_2 concentrations are stabilized at 550 ppmv. Prices are multiple thousands of dollars per ton by mid-century in the 450 ppmv case.

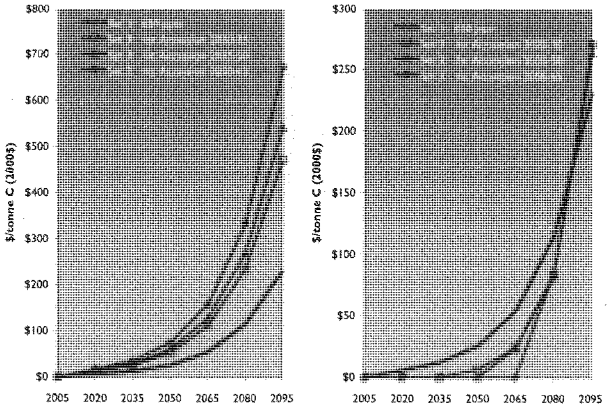

Figure 5.7. Set 3 Regional Carbon Prices 650 ppmv – Annex 1 and India

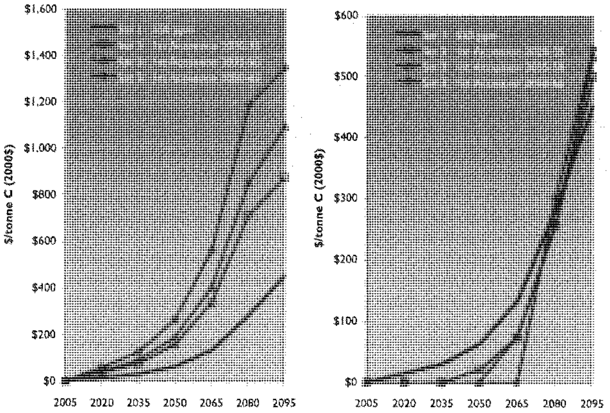

Figure 5.8. Set 3 Regional Carbon Prices 550 ppmv – Annex 1 and India

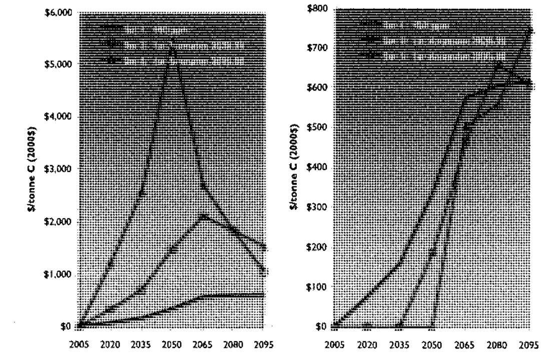

Figure 5.9. Set 3 Regional Carbon Prices 450 ppmv – Annex 1 and India

Although the global 550 ppmv CO_2 emissions trajectory in Set 3 is similar to the global 550 ppmv emissions trajectory under first-best policy conditions, there are dramatic differences at the regional scale (Figure 5.10 and Figure 5.12). (There is some displacement of emissions reductions to the future in Set 3 as compared to first-best.) The U.S. emissions decline dramatically faster in Set 3 than under first-best policy conditions. In Set 3, with non-Annex I accession delayed to 2035 or later, U.S. emissions are forced to become negative before the end of the century.

The Set 3 450 ppmv cases are even more dramatic. Again, there is little difference in the global emissions trajectories between the first best and Sets 2 and 3. However, at the regional scale, the U.S. emissions reductions exceed 50 percent by the year 2020 with any delay in non-Annex I accession even to 2020. Aggregate Annex-I regions reduce emissions 40 percent relative to 2005 for a delay in accession to 2020. As with Set 2, stabilization is physically infeasible if accession is delayed past 2050.

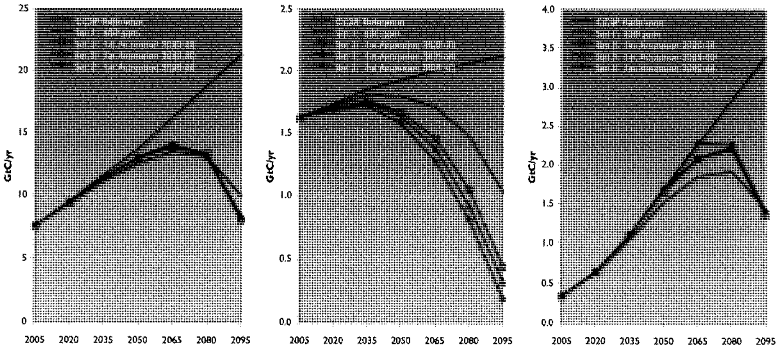

Figure 5.10. Set 3 Stabilization at 650 ppmv—Global, U.S., and India Emissions

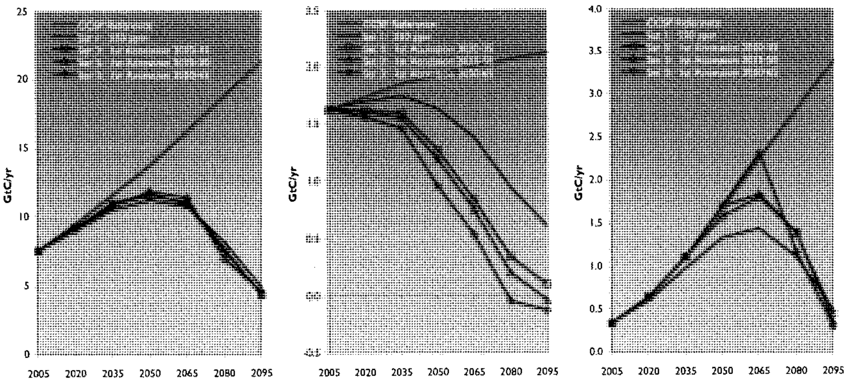

Figure 5.11. Set 3 Stabilization at 550 ppmv—Global, U.S., and India Emissions

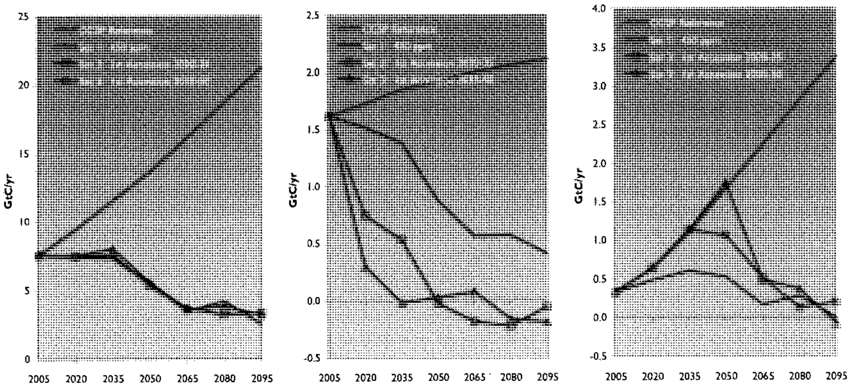

Figure 5.12. Set 3 Stabilization at 450 ppmv—Global, U.S., and India Emissions

6.0 The Distribution of Costs Associated with Delayed Accession

Inefficiencies in the carbon market increase the economic costs of stabilizing CO_2 concentrations. Delays in accession are one example. For any environmental goal, the greater the delay in accession, the lower the efficiency, and therefore the greater total cost to society of achieving the environmental goal.[1]

Table 6.1. Percentage Increase in Total Social Cost of Stabilization at Alternative Levels of Atmospheric CO_2 Relative to First Best [2]

Scenario	450 ppmv	550 ppmv	650 ppmv
First Best	100%	100%	100%
2020 Set 2	28%	12%	8%
2035 Set 2	265%	28%	23%
2050 Set 2	Infeasible	65%	40%
2020 Set 3	112%	47%	36%
2035 Set 3	394%	69%	54%
2050 Set 3	Infeasible	159%	83%

Three factors influence explored here influence the total discounted costs of stabilization: (1) the length of delay ("when" flexibility), (2) the degree to which participating countries equalize marginal abatement costs ("where" flexibility), and (3) the stabilization level. The cost effects of delay are isolated in the Set 2 scenarios (Table 6.1). It is no surprise that the cost of delayed accession increases with the length of delay; that is, the longer the first accession is delayed, the greater the incremental cost for reaching any environmental goal. After all nations join the emissions mitigation regime, perfect "where" flexibility is established and that source of incremental social cost is eliminated. However, as noted earlier, late entrants to mitigation may face difficulties in the form of carbon price "shock" associated with later accession to a regime whose carbon price had been escalating along a HPW path.

The incremental influence of inefficiencies in "where" flexibility is captured by the Set 3 scenarios. These scenarios eliminate the price shock from joining the coalition of emissions-reducing countries, which could be seen as a desirable characteristic of a global policy regime. However, they have the effect of pushing non-Annex 1 emissions reductions even further into the future for any given set of accession dates. The distinction between the Set 2 and Set 3 scenarios can be posed from a policy perspective as a tradeoff between accession date and the ease of accession: these two inefficiencies can be traded off to meet a given cost goal. For example, meeting a 450 ppmv stabilization limit with first accession in 2020 and gradual entrance into the coalition is roughly equivalent to meeting this same limit with first accession between 2020 and 2035 but assuming immediate entrance into the coalition. Meeting a 550 ppmv stabilization limit stabilization limit with first accession in 2035 and gradual entrance into the coalition is roughly equivalent to meeting this same limit with first accession in 2050.

The cost impacts of delay are increasingly potent the tighter is the stabilization level. That is to say, the percentage increases in costs relative to first-best from the introduction of "where" and "when" inefficiencies are higher the more stringent is the constraint. Again, this is a result of the inherent physical limitations to flexibility that arise from the operation of the carbon cycle. As emissions reductions are reduced or delayed in non-Annex 1 countries, the result is that Annex 1 countries must move to increasingly higher marginal cost mitigation measures, increasing costs. The limits to total emissions also affect these marginal costs. Delays in the 450 ppmv scenarios push Annex 1 countries into increasingly high near-term marginal cost regimes.

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[1] The regional or national effects of stabilization are a function of the distributional mechanisms embodied in any policy, so imperfections may or may not increase the economic impacts to specific countries or regions.

[2] Global costs represent the discounted value of costs from 2005 through 2095 under a 5% discount rate.

Delayed accession and gradual entrance of non-Annex I regions both reduce the proportion of emissions mitigation costs that are borne in non-Annex I regions (Table 6.2). Note that these costs represent only the portion of mitigation costs borne in each of these countries; they do not represent the costs to the countries themselves, which would depend, for example, on the burden-sharing scheme in a cap-and-trade system or explicit transfer payment schemes in other policy structures.[3]

Table 6.2. Fraction of Total Social Cost of Stabilization at Alternative Levels of Atmospheric CO_2 Borne by Non-Annex I Regions

Year of First Accession	450 ppmv	550 ppmv	650 ppmv
First Best	66%	72%	73%
2020 Set 2	60%	69%	71%
2035 Set 2	35%	63%	68%
2050 Set 2	N/A	59%	65%
2020 Set 3	26%	38%	42%
2035 Set 3	17%	34%	36%
2050 Set 3	N/A	28%	31%

Ironically, in Set 2, delays in accession shift the burden away from non-Annex I regions and toward Annex I regions, but the induced inefficiencies actually result in higher non-Annex I present discounted total costs than under first-best policy conditions. However, those costs are only encountered after the accession. In the near term, delays in accession allow non-Annex I regions to avoid emissions mitigation costs all together. Therefore, Annex I discounted total costs rise even more. Set 3 is another consideration. While global total costs rise still higher than in Set 2, delays in accession and lower-marginal carbon prices lead to greater reductions in the share of global total costs borne by non-Annex I in its emissions mitigation. Total present discounted non-Annex I emissions mitigation costs are also reduced in all of the cases analyzed here.

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[3] This analysis assumed that all regions of the world imposed a price on themselves to achieve emissions mitigation. There were no transfer payments, as would occur in a "cap-and-trade" regime. As noted earlier, emissions mitigation would be similar in both a "cap-and-trade" regime and a carbon price regime. However, the "cap-and-trade" regime assigns property rights, which may be different from emissions in the mitigation regime. Such differences would introduce associated transfer payments, whose magnitude and direction of transfer depend entirely on the allocation of emissions rights.

7.0 Final Considerations

Second-best worlds are just that: second best. By definition, stabilization in economically inefficient regimes imposes a greater burden on global society to achieve the same environmental benefit as economically efficient regimes. This paper has explored the implications of two types of inefficient hypothetical international protocols that would result in the stabilization of CO_2 concentrations. These delays have nonlinear implications for stabilization costs in both the degree and character of delay, and the stabilization level.

Stabilization at a concentration of 450 ppmv is fundamentally different than stabilization at higher CO_2 concentrations. The 450 ppmv concentration is so close to present concentrations, and demands for fossil fuels rise so rapidly in non-Annex I nations, that delays in accession have severe consequences for regions in the control coalition. Under the assumptions in these scenarios, a reduction of more than 85 percent relative to 2005 annual CO_2 emissions in 2050 by Annex I nations is consistent with stabilization of CO_2 at 450 ppmv if non-Annex I regions accede into a heterogeneous control regime after 2020. Still more severe reductions are required if non-Annex I regions delay longer. Much greater latitude is available in the 550 and 650 ppmv stabilization regimes; that is, emissions mitigations associated with 550 or 650 ppmv stabilization regimes require far less-stringent emissions mitigation by 2050, and the effect of delayed accession has a far lesser effect on Annex I emissions mitigation.

A fundamental premise of delayed accession is that regions will see different effective carbon prices, a premise that has been examined in various ways in this paper. The scenarios in this paper have demonstrated potentially dramatic increases in carbon prices in Annex I regions, resulting from delayed accession. This raises the question of whether it is plausible to envision a world, as this paper has done in some of its scenarios, in which the Annex I countries conduct mitigation with carbon prices in excess of $1000 dollars/tonne, while the non-Annex I countries take no mitigation action whatsoever. This sort of asymmetry would certainly give rise to internal pressures in the participating countries to take advantage of opportunities for low-cost reductions in nonparticipating countries. One role of the Clean Development Mechanism of the Kyoto Protocol was to provide a mechanism by which carbon price signals could be transmitted to non-Annex I regions prior to their accession. In the real world, other mechanisms might be expected to be developed to cushion both the shock of accession and the internal pressures that would develop in participating nations due to the asymmetric requirements among nations.

This paper has not fully explored the domain of CO_2 concentration limits in the context of second-best international control regimes, and much work remains to be done in this area. Future work might explore interactions between domestic inefficiencies and the international regimes, and it might explore the implications of various mechanisms for minimizing asymmetry between regions. Future work also needs to begin the systematic exploration of second-best regimes that "over shoot" their concentration ceiling. For example, exceeding an atmospheric CO_2 concentration of 450 ppmv does not necessarily mean it is lost forever. However, overshoots come with their own costs and that domain needs to be explored systematically.

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Europe's dirty secret:
Why the EU Emissions Trading Scheme isn't working

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Contents

3 **Foreword**

5 **Executive summary**

16 **A review of phase one – why the ETS has not cut emissions (2005-2008)**

18 **Will there be any improvement in phase two of ETS? (2008-2012)**

19 **Not cutting our emissions – but paying for "reductions" outside the EU**

- i) Will 'hot air' from Russia undermine carbon markets?
- ii) The oversupply of Kyoto credits
- iii) Even in a best case scenario the majority of EU 'reductions' will still be imported

27 **Why Kyoto project credits will undermine domestic action but won't deliver clean development**

- i) Kyoto projects are often harmful in environmental terms
- ii) Serious loopholes create massive distortions in carbon markets, divert investment from green technologies, and do not aid development
- iii) Greater market uncertainty, and downward pressure on EU permit prices

35 **Lack of long term price signal: a fundamental problem of ETS phase two**

36 **High costs and intra-EU economic distortions**

- i) Large divergence between allowances and Kyoto credit entitlements for companies in different member states
- ii) EU-wide costs of €15-20bn – if it works
- iii) Could increase future burdens for non-ETS sectors

42 **Irrational allocation remains – small installations suffer disproportionately**

43 **Relocation and avoidability – an environmental and economic problem**

45 **Auctioning still has not been properly utilised: problems of free permit allocation will continue in phase two**

46 **Emissions trading remains vulnerable to gaming**

50 **Looking forwards: what future for the ETS?**

52 **Annex: National Allocation Plans and verified emissions for phase one and phase two ETS**

54 **Bibliography**

Foreword

The revival of the EU Constitution under a new name has given an unexpected prominence to the question of the EU's role on the environment. Supporters of the text have repeatedly fallen back on the argument that, whilst the Constitution may have been rejected by voters in France and the Netherlands, treaty change is still urgently needed to allow the EU to 'take action' against climate change. But that is simply not true. The new treaty will contain some nice new words about combating climate change, but it will not give the EU any new powers to do something about it. Those who claim differently are either engaging in a PR-exercise or have not read the treaties. Or possibly both.

In fact, the EU already has powers to act on global warming. Politically informed people would even know that it already has a policy. And if the new version of the EU-Constitution is adopted the EU will not get any new powers to deal with the problem.

So the real problem with global warming is not that the EU lacks a Constitution. The real problem is that the EU's policy on climate change doesn't work.

British Foreign Secretary David Miliband has on many occasions spoken of the need for the EU to be seen as an "Environmental Union", arguing that the European leaders should try and tap popular concern over transnational issues such as global warming as a means of bolstering flagging support for the "project" across the continent.

There has so-far been limited questioning of the hazy assertion that the EU is good for the environment. This new study from Open Europe attempts to challenge this claim, arguing that real environmentalists should be very sceptical indeed of the EU's record on this area. The paper takes a close look at the EU's Emissions Trading System and argues that the existing policies in this area are fundamentally flawed.

The Emissions Trading Scheme (ETS) is supposed to be the EU's main policy tool for reducing emissions. But so far, it has been an embarrassing failure. In its first phase of operation, more permits to pollute have been printed than there is pollution. The price of carbon has collapsed to almost zero, creating no incentive to reduce pollution. Across the EU, emissions from installations covered by the ETS actually rose by 0.8%.

The Commission insists that it has learned its lesson, and has reassured us that in the second phase of the scheme, which runs from 2008 to 2012 will work better because it has clamped down on the over allocation of permits by member states.

Open Europe argues however that in fact things have gone backwards for the ETS. In the second phase of the ETS member states will be able to "import" external Kyoto "credits" from developing countries in order to meet their targets for reductions. This might be unobjectionable if these 'imports' reflected real emissions cuts. But these credits have already been exposed as highly flawed, and often fraudulent. They don't always reflect absolute reductions in emissions, whilst many of these credits are generated from projects in developing countries that would have happened anyway. Such credits actually mean increased pollution.

Furthermore, many credits will be generated through a system which allows polluters to bag massive profits for very little effort. Unsurprisingly, the main beneficiaries will be large, highly capitalized firms with the capacity to attract the attention of speculative investment in potentially lucrative 'green' projects. Meanwhile, community level development will be sidelined, and sub-Saharan Africa will see just 4% of total investment from Kyoto credits.

The Open Europe report finds that it is highly likely that the majority of CO2 reductions in the next ETS phase will be simply 'bought in' through these imported permits. That means the ETS won't reduce emissions in Europe, and won't encourage companies to invest in low carbon technology – surely the main purpose of any serious climate change policy?

The report concludes that far from creating a credible basis for EU level action on climate change, the ETS has instead established a web of politically powerful vested interest groups, massive economic distortions and covert industrial subsidies. It will do practically nothing to fight climate change. It's good news for the traders and the large firms who will reap tens of billions of euros worth of profit through emissions trading. It's less good news for those who will suffer the consequences of global warming.

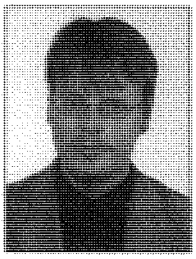
The EU believes the ETS can become the hub of a future global carbon market, and indeed has staked considerable political capital on the success of the scheme. However, it is proving difficult enough at present to even agree on overall international targets for emissions reductions: trying to also agree on the policies to meet them would be an impediment to reaching agreement.

Open Europe's paper argues that international action (whether through the EU or on a larger scale) should focus on setting tough and enforceable national targets for greenhouse gas reduction, but should leave decisions on how to reach those binding targets up to individual countries. This approach would give national governments the flexibility to explore alternatives to emissions trading – most notably green taxes – as part of their strategy for combating climate change.

Behind the idea of emissions trading lies the unspoken dream of preventing global warming on the cheap. The EU would very much like to be seen as doing something about global warming. And the ETS is a politically inexpensive way of making that impression. Unfortunately, as this study shows, the system looks more and more unlikely to succeed.

The EU doesn't need an EU-Constitution to fight climate change - it simply needs the political will to develop policies that work.

Max Andersson, Green Party Member of the Swedish Parliament



Executive summary

Phase one of the EU's Emissions Trading Scheme was a failure

- The first phase of the EU's Emissions Trading Scheme (ETS), which runs from 2005 to 2007 was a failure. Huge over-allocation of permits to pollute led to a collapse in the price of carbon from €33 to just €0.20 per tonne, meaning that the system did not reduce emissions at all.

- Worse still, since some countries (such as the UK) had set tough quotas on emissions, and others set lax targets, the system acted as a wealth transfer mechanism, effectively subsidising polluters in states which were making little effort by taxing states with more stringent allocations. Overall there are about 6% more permits than pollution. However the UK has to buy about 22 million tonnes worth of permits a year, while firms in France and Germany could sell off a surplus of around 28 and 23 million tonnes respectively.

- Finally, the ETS in phase one was not a real market – instead of auctioning off permits to pollute, member states allocated them free of charge to companies based on how many the government believed they needed. This created severe distortions. Large companies which lobbied for more permits than they needed were able to sell them on at a profit. Other institutions – particularly smaller institutions like hospital trusts – proved less effective at lobbying. They got too few permits and therefore had to pay into the system.

- As the cross-party Commons Environmental Audit Committee noted: "there is little or no evidence that Phase I is leading to any cutbacks in actual emissions at all, whether in the UK or elsewhere in the EU." In its first year of operation (2005 to 2006) emissions covered by the ETS *rose* 3.6% in the UK, and rose by 0.8% across the EU as a whole.

- Defenders of the system stressed that these were just 'teething problems'. It was hoped that pressure from the Commission would succeed in making member states set caps for the second phase (2008-2012) which would be tight enough to build a workable market in carbon. The goal is to impose a stable "cost" on carbon emissions sufficient to incentivise investment in cleaner technologies, and eventually moves towards a low carbon economy.

- At first glance the second phase of the ETS will indeed create some 'scarcity' in allowances to pollute. In other words, there should be fewer permits to pollute than there is pollution in the EU. Indeed, member states agreed to make further reductions in their overall cap as the result of pressure from the Commission. Supporters of the system have argued that this shows why a strong European Commission is needed, and argue that the system will now start to work.

Are things really going to be better in phase two?

- However, in an important respect the system has actually gone backwards. Unlike in the first phase, in the second phase member states will be able to "import" Kyoto "credits" in order to meet their targets for reductions.

- In order to get a speedy agreement on a piece of legislation which allows the import of these Kyoto credits (the Linking Directive[1]) before the 2004 European elections, it was agreed that member states would be able to decide for themselves how many permits they would import. Professor Catrinus Jepma argues that "The Linking Directive was clearly a political compromise to enhance acceptance of the EU ETS."[2]

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[1] 2004/101/EC

- Collectively, member states have set themselves import allowances which are more than enough to cover all the likely scarcity in the system. The World Bank estimates that the overall scarcity of permits in the second phase will be around 1.2 billion tonnes of CO2. But EU member states have allowed themselves to import about 1.3bn tonnes worth of credits to meet this target. The UK, Spain, Finland and Italy are the only member states so far to set a target which cannot be met entirely by imported credits, if we compare allocations with 2006 verified emissions.

- As the UK House of Commons Environmental Audit Committee has noted, "**the Government is allowing for, and expecting, two-thirds of the headline carbon savings it has announced as resulting from Phase II to take place, not just outside the UK, but outside the EU... In fact, the effects of such credits on UK installations will – indirectly – be even higher than this, because other Member States have set higher limits on the use of such credits within their National Allocation Plans.**"[3]

- **This means it is likely that a majority (if not all) of the "reductions" which are being made as a result of the system will take place outside the EU.** The British Government has budgeted for just one third of the required "effort" in the UK to be made domestically, the remainder being met with Kyoto credits. The Government has said that the UK's limit on imports of Kyoto project credits "represents around two-thirds of the difference between business as usual emissions and the total cap (ie. the level of effort in the UK), thereby balancing the need for domestic action with the benefits of investing in overseas projects."[4] However, across the scheme as a whole there is no such "balance": other member states have set higher import quotas. They will be able to import more than enough credits to cover their own scarcity and then sell them on to UK firms (at a profit). So even the UK and other members with tighter import quotas should be able to cover all their reductions with imports via other member states. Therefore, even for the UK, in theory there would not need to be any domestic emissions reductions.

- Kjetil Røine, Carbon Market Research Manager at Point Carbon, has said that "we do not expect that the credit limits will be the constraining element for the CER/ERU inflow to the EU ETS... The overall picture is that there seems to be nearly sufficient supply of credits to meet the estimated shortage in the EU ETS over the first Kyoto period" [i.e. to 2012].[5] A recent report from WWF, focussing on the nine member states with the highest emissions levels, said that between 88% and 100% of emissions reductions in these states could be bought in through use of Kyoto credits.[6]

- **The Commons Environmental Audit Committee has noted that "it is theoretically possible the EU ETS might not be responsible for any emissions reductions within the UK at all." The Government's response to the Committee report states that "The Committee's theoretical observation is correct".**[7]

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[2] *Joint Implementation Quarterly* (April 2007)

[3] House of Commons Environmental Audit Committee, Second Report, *The EU Emissions Trading Scheme: Lessons for the Future* (01.03.07)

[4] Government Response to the Environment Audit Committee, Second Report of Session 2006-07, The EU Emissions Trading Scheme: Lessons for the Future

[5] Røine, K. "CDM/JI supply: Will there be enough?", *Carbon Market Europe*, Point Carbon (1 June 2007)

[6] WWF, *Emission Impossible: access to JI/CDM credits in phase II of the EU Emissions Trading Scheme* (June 2007)

[7] Government Response to the Environment Audit Committee, Second Report of Session 2006-07, The EU Emissions Trading Scheme: Lessons for the Future

- The process of negotiating the National Allocation Plans for phase 2 showed the limits on the Commission's ability to crack down on over-allocation by the large member states. In particular, Germany accepted a reduction of its total emissions cap of 28.9 MT only in return for an increase in its Kyoto credit import quota of 32.8 MT – so in reality, while the Commission looked tough, the overall cap was actually weakened during the negotiations.

Kyoto credits: are we getting real reductions for our money?

- In principle, it would be unobjectionable for reductions to take place elsewhere in the world if this meant they could be achieved at lower cost. However in practice there are a number of serious problems. The Kyoto credit system is failing to deliver significant reductions in emissions in return for the huge funds that are being channelled into it, due to a number of important flaws in the system.

- **Reducing emissions or subsidising pollution?** Kyoto credits are not awarded for absolute emissions reductions, but rather on the basis of avoidance of even higher emissions that would otherwise have occurred, so many of the credits are awarded to environmentally harmful projects. Project credits do not generally deliver 'clean development' – the original rationale behind the mechanism. Only 2% of credits so far issued originate from renewable energy projects.

- Indeed, Kyoto credits are often awarded to projects that are already happening anyway. This is known as a lack of "additionality" in the jargon. For example, the Xiaogushan dam in China was awarded US$30m worth of credits, even though construction of the dam had been long underway, was nearing completion, and had already been given loans by the Asian Development Bank. The Jindal metal plant in India, the largest sponge iron plant in the world, is an example of a programme claiming carbon credits for technology that would have been installed anyway. A study by a UN advisor in India concluded that a third of projects he surveyed did not provide additionality.

- Without additionality, investment in projects like Jindal simply means subsidising the expansion of emissions-increasing activity. A more extreme version of this problem could be described as "moral hazard" – unscrupulous companies are given an incentive to create pollution in order to be paid to clean it up; for example to open a factory which produces exotic greenhouse gasses.

- Sanjeev Kumar, ETS coordinator at the WWF, warns that: "instead of paying to reduce global greenhouse gas emissions, poor quality CDM projects means that we pay to increase emissions. In a carbon constrained world, this insanity cannot continue."[8]

- **Around half the money spent on Kyoto credits to date has been awarded to projects to clean up so-called "exotic" greenhouse gasses – many of which are scams.** A particularly striking example, revealed in a study by Stanford University economist Michael Wara, relates to chemical factories producing the HFC-23 gas. These installations can reduce their emissions with a simple piece of equipment known as a scrubber, which generally costs a few million dollars. However, since HFC-23 is so potent (one tonne of the gas being equivalent to 11,700 tonnes of carbon dioxide) companies that install this equipment are eligible for tens of thousands of carbon credits for reducing just a few tonnes of the gas. This means that HFC-23 projects have received more credits than any other in the carbon markets so far.

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[8] Point Carbon, *Carbon Market Europe,* 15 June 2007

- HFC-23 projects that will have cost no more than €100m to carry out have absorbed €4.6bn of the funds spent on such credits. There is even evidence to suggest that production of this gas has increased in response to the prospect of lucrative profits to be made through this loophole in the system.

- The Commons Environmental Audit Committee concluded that there was "compelling evidence" that such projects "should be subject to serious doubt." The UN has promised to clamp down on such scams, and has attempted to restrict credits for HFC-23 projects. However, there is already evidence that speculators have moved on to other high-value exotic greenhouse gasses.

- **Kyoto credits are not even reaching the poorest countries.** The vast bulk of investment in Kyoto projects is being channelled towards India and China. Sub-Saharan Africa remains marginalised, set to generate just 4% of total credits. Meanwhile, the Chinese state will enjoy increased revenue flows as a result of the Kyoto mechanisms. Most of the world's HFC 23 production is located in China, and Beijing has imposed a 65% export tax on this type of project. Analysts have predicted a potential annual revenue stream of up to $2.25 billion.[9] Beijing has made no commitment that this money will be reinvested in projects that cut carbon.[10]

- **Paying for reductions elsewhere means losing several of the benefits of reducing domestic emissions.** Even if the Kyoto system was delivering emission reductions, it might be worth noting that paying for emissions reductions elsewhere means that the countries paying lose several of the side benefits of reducing their own energy use and emissions. For example, paying for reductions elsewhere will not increase member states' energy security. It also means losing a demonstration effect – showing the rest of the world that it's possible to break the link between growth and rising emissions.

Undermining the ETS without getting reductions elsewhere?

- Worse still, the Kyoto mechanisms themselves could be swamped by a huge oversupply of permits. It is quite possible that supply of credits in the 2008-12 period will exceed demand, a scenario which would lead to very low carbon prices.

- Given member states' generous Kyoto credit import allowances, the price of carbon in the EU ETS is set to be driven largely by the price of Kyoto credits. So a low price for Kyoto credits would mean the price of carbon in the EU system would again fall to a level which does not reduce emissions. Indeed, the uncertainty generated by the complexity of these interacting systems is itself likely to lead to a more volatile carbon price - and therefore make it difficult for firms to plan to invest in reducing emissions.

- Jepma argues that because of the structural weaknesses in the ETS, and the predicted oversupply of Kyoto credits, phase two could well go the same way as phase one: "Sadly enough, the Linking Directive rules for the EU ETS second phase are such that the expected net demand under the EU ETS scheme can easily be met through JI and CDM credits (in fact, the accepted limits to using JI and CDM credits under the ETS are so wide that most installations can most likely cover any deficits through these credits). Through the Linking Directive, low credit prices under the Kyoto Protocol will push down second phase EU ETS prices. Also for the EU the opportunity to put real prices on carbon will then be lost."[11]

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[9] http://www.adb.org/media/Articles/2006/10594-PRC-CDM-potential/

[10] Point Carbon (08.06.07)

- Jepma's calculations from April 2007 suggest that there will be a supply of around 5.75 billion tonnes worth of credits coming onto on the market, while there is only going to be demand for 3.5 billion tonnes' worth. This suggests that prices for Kyoto credits will fall to a very low level unless sellers form some kind of cartel. Jepma concludes that: "there are fairly strong arguments to support the view that even during the Kyoto Protocol's commitment period (which coincides with the EU ETS 2nd phase), a similar pattern of slightly rising but eventually almost collapsing credit prices may take place." [12]

- This will drag down the price of carbon within the EU. In its 2003 impact assessment[13] looking at the effect of linking to the Kyoto mechanisms, the Commission suggested that importing 12.7% of emissions would reduce the price of carbon in the ETS from €26 to €4.8 – even without considering the effect of the huge oversupply of Kyoto credits which has emerged. In practice the EU as a whole will be able to import up to 13.6% of its emissions.

Still not a real market in phase two

- In phase one, power generators are believed to have made over £2bn in the UK alone in windfall profits by passing on the notional cost of carbon to consumers,[14] having been given permits for free. Extraordinarily, auctioning of permits still has not been properly utilised in phase two. In fact, auctioning is restricted to 10% of the total, and only around 1.5% of permits will be auctioned in practice (7% in the UK). Having the government decide how much effort each firm should make defeats the whole point of running a trading system.

- Worse still, member states are using free allocations to deliver subsidies to polluting industries – particularly coal. As Economist Karsten Neuhoff notes: "Any free allocation represents a subsidy – and where only fossil-fuel generation is subsidized, this distorts investment choices in favour of fossil-fuel generation. Where coal receives a higher allocation than gas, the investment choice is, in addition, distorted towards coal. The level of such subsidies under proposed second-phase NAP is so high that the construction of coal power stations is more profitable under the ETS with such distorting allocation decisions than in the absence of the ETS."[15]

- The Carbon Trust argue that "The fact that new emitting sources get free allowances but zero-carbon power sources do not obviously weakens incentives to invest in the latter. This problem is exacerbated by specific details in many of the plans. Most notably, the German NAP offers unlimited 'technology specific' free allowances to new power stations, so that coal power stations get about twice as many as gas, and adds a 'load factor' correction, in which the most polluting plants (lignite) are granted an *additional* 10% more allowances, officially on the grounds that they are expected to operate more… many countries offer such fuel-specific subsidies for new entrants, but Germany is unique in the scale of subsidy offered to the most polluting ones."[16]

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[11] Jepma, C. "Credit prices down the drain?" *Joint Implementation Quarterly* (April 2007)
[12] *Joint Implementation Quarterly*, (April 2007)
[13] European Commission, Impacts of Linking JI and CDM credits to the ETS, May 2003
[14] Reported in *Sunday Times* (03.06.07)
[15] Neuhoff, K. et al., "Implications of announced phase II national allocation plans for the EU ETS", *Climate Policy* 6 (2006)
[16] Carbon Trust, *EU ETS Phase II allocation: implications and lessons* (May 2007)

- As analysts have noted, this degree of free allocation gives few incentives for emissions reductions amongst new installations entering the ETS. In fact, this aspect of the system creates perverse incentives for greater investment in polluting technologies such as coal, rather than encouraging a shift to cleaner energy sources.

- Real markets have the advantage that central planners don't need to collect lots of information. However the ETS requires firms to monitor and verify their emissions. Firms will have to pay for such certification, and generally have to employ outside experts to verify their emissions.

- The ETS is costly to comply with. We estimate administration costs of around £65m for the UK alone over phase two.

- Small installations suffer disproportionately in complying with the ETS. For example the UK's phase two national allocation plan (NAP) still includes a very large number of smaller installations. These represent 43% of the total number of installations in the scheme, yet account for just 1% of the total emissions. For smaller players pure admin accounts for a large proportion of the total costs. For example the phase one of the ETS cost the NHS around £6m, £1.5m of which was administrative costs.

What's the net effect? What's the best case scenario?

- It is quite possible that the second phase of ETS will again fail to put a serious price on carbon. EU and Kyoto carbon prices may fall to very low levels, leading to no meaningful reduction in emissions.

- To see what the system might look like if it did work, we could assume that (a) the oversupply of Kyoto credits is solved or that (b) either member states do not use their import quotas or have higher than expected emissions. What would the system achieve if a meaningful price is realised?

Winners and losers in phase two

- The price of carbon in phase two is difficult to predict – itself a reason why the system is unlikely to deliver reduced emissions. To repeat – there are good reasons to think that phase two will once again fail to put a serious price on carbon. This makes it difficult to put an exact cost on the different levels of "effort" member states are making.

- However, the table below gives indicative estimates of the relative effort different member states will need to make under phase two of the ETS, on the basis of the gap between 2006 emissions and the phase two cap. We then assume that the various problems described above are solved and a meaningful price is achieved, to work out how much this would then cost.

	Required total reductions % of 2006 emissions, adjusted for new entries (negative numbers are surpluses)	**Kyoto credit use** % of 2006 emissions, adjusted for new entries	**Domestic Reduction** % of 2006 emissions	**Cost per year** (low carbon price) €M (negative numbers are profits)	**Cost per year** (high carbon price) €M (negative numbers are profits)
Austria	5.2	9.5	-4.3	14.1	25.1
Belgium	2.5	8.2	-5.7	12.6	22.5
Cyprus	-3.4	10.3	-13.3	-1.5	-2.7
Germany	7.2	18.6	-11.4	293.2	523.6
Estonia	-2.6	0.0	-2.6	-5.2	-6.3
Spain	18.1	16.4	1.7	308.8	519.4
France	-3.1	13.9	-17.1	-68.0	-80.3
Greece	1.3	8.9	-7.6	7.6	13.5
Hungary	-5.9	10.6	-16.5	-20.1	-26.9
Ireland	-2.8	10.3	-13	-5	-9
Italy	13.7	12.9	0.8	277.8	477.2
Luxembourg	0.0	10.0	-10.0	-0.8	-0.5
Malta	*4.1*	*tbd*	*4.1*	*0.8*	*1.4*
Netherlands	1.5	9.9	-8.4	10.9	19.5
Poland	2.9	9.7	-6.8	54.6	97.5
Sweden	-3.4	10.4	-13.8	-7.6	-13.5
Slovenia	6.1	14.8	-8.7	4.5	8.1
UK	13.6	6.9	6.7	490.7	677.4
Finland	16.4	8.4	8.1	93.5	129.2
*Portugal	-	-	-	-	-
†Slovakia	-13.6	8.0	-21.6	-39.7	-60.5
*Denmark	-	-	-	-	-
†Lithuania	-33.3	11.9	-59.9	-18.4	-32.9
†Latvia	26.7	5.6	16.4	6.6	11.8
†Czech	-3.8	10.4	-14.2	-26.9	-48.0

*These countries did not at the time of writing have their national allocation plans approved by the Commission.
†For these countries, data produced serious inconsistencies in results.

- Because companies in different member states are subject to different levels of stringency in their overall emissions caps and their entitlement to use (cheaper) Kyoto credits, there will be differentiated levels of 'effort' they need to make in order to comply with the ETS. This means economic distortion will occur. As in the first phase of the ETS, these distortions act as an effective subsidy to companies in countries that have not chosen to impose ambitious emissions caps, transferring wealth away from countries which have. The UK will suffer amongst the highest costs in Europe in absolute terms in order to comply, largely as a result of its smaller project credit entitlement and relatively tough overall target. Germany, despite emitting 75% more CO2 than the UK, will pay less.

- In fact, the UK, Spain, Finland, and Italy, because they cannot meet their target entirely by imported credits, are likely to face even higher costs, while the costs for other member states will be lower. This is because firms in other member states will be able to carry out a profitable "carry trade" – importing cheap Kyoto credits, while selling off their surplus EU credits (which are more expensive) to the UK, Spain, Finland, and Italy. One market trader has described the process as "in essence, free money"[17] for participants in a position to sell Kyoto credits; others might see it as a covert subsidy mechanism.

- Over five years, we estimate the second phase of the ETS would cost the UK £1.6 to 2.3bn. As a proportion of GDP, Spain and Finland will need to spend the most. Across the EU, we estimate that if the system does work it will mean costs across the EU of between **€15 to 20bn**, excluding administrative costs. Around €8.5 to 15bn of this expenditure would be directed towards Kyoto projects, many of which are subject to the serious deficiencies set out above; around €3.2 to 5.7bn of such investment from the ETS would be spent on exotic gas capture projects. This is clearly not an effective use of resources in tackling climate change. Even under this optimistic scenario, we could expect just one quarter of emissions reductions to be domestic. The other three quarters would come through Kyoto credits.

If the ETS does work, instead of increasing energy security, it will make the EU more dependent on Russian gas

- If the ETS does have an impact, one perverse effect may be to increase the dependence of the EU on Russian gas.

- The most significant reduction in emissions can only come about as the result of long term decisions to invest in cleaner machinery, which requires a high, stable and predictable long term price on carbon. However, because there is some excess capacity, the electricity sector is able to respond to some degree in the short term to changing carbon prices by switching some production from burning coal to more gas, which is cleaner. This does not change the long run trend of emissions growth, but can vary emissions up or down relative to their trend path.

- For this reason a report by McKinsey for the European Commission finds that if the ETS does lead to any significant price for carbon, one of its main effects is going to be to lead to a substantial increase in the EU's dependence on Russian gas. At a carbon price of €20 a tonne the study predicts that the EU ETS will have increased the EU's imports of gas by just under 30% by 2020. The report for the Commission predicts that the share of the EU's electricity generated by gas-burning power stations will go from 23% in 2005 to 45% in 2020.

Can EU emissions trading be made to work?

- Emissions trading is still widely viewed as a cost effective and efficient way of reducing greenhouse gas emissions. Carbon trading schemes attempt to impose a cost on carbon sufficient to incentivise investment in cleaner technologies and thereby a shift towards a lower carbon economy. For many free marketers, the fact that some environmentalists object to trading schemes on non-economic grounds strengthens their view that emissions trading is the right way forwards.

- The current state of the debate is that "teething problems" with trading can and will be solved. However, while some problems with the ETS are contingent on particular decisions which could be reformed, some of the problems which are emerging are more fundamental.

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[17] *Point Carbon* (11.07.07)

Reformable aspects

- **Lack of auctioning.** As long as permits are allocated and not auctioned the system is not going to be worth having. As well as unintentional distortions caused by the handing out of free permits, there is clear evidence that the system of free allocations is very vulnerable to lobby group pressure, and is also being deliberately used to provide covert industrial subsidies to polluting industries. The very complexity of the system enables and encourages this.

- In theory the system could be reformed so that 100% of permits were auctioned. However, given that only 1.5% of permits are being auctioned in the second phase there is clearly political resistance to this. It may take a very long time to get agreement to move to full auctioning in the system. This would cut across the member countries' stated goal of reducing emissions urgently.

- **Too many small installations.** At present too many small installations are included. In the UK, 43% of the firms (all facing large admin costs) are producing just 1% of emissions in the system. The cost of including these smaller installations will outweigh the benefits. This could be remedied by raising the threshold for inclusion. However, the Commission has said it will not even look at this issue until after phase two. Again, it may be difficult to get agreement among the 27 to solve this problem in the near term.

More fundamental problems

- **Uncertainty and the lack of a long term price.** Two aspects of the system make it difficult for firms to plan to make the long-term investments needed to reduce emissions. Firstly, the instability of the carbon price in the system (gyrating wildly between €33 and €0.20 in phase one) and secondly the short trading periods. Both are fairly structural problems.

- For example, at the moment there is no way to know what will happen after phase two (it is difficult enough to know what will happen *in* phase two). A November 2005 survey by McKinsey and Ecofys for the European Commission found that 93% of businesses wanted the trading period extended to ten years or more. However, governments are unlikely to agree to this as it means that caps can only be revised down every ten years, and so the path of emissions reductions would have to be very gradual (which is why none of the Government bodies surveyed agreed with this idea).

- However, without certainty firms cannot plan to reduce emissions. As a spokeswoman for Drax power station (the UK's largest emitter) put it: "Drax has six units, it's like having six mini-power stations on one site. We have one unit out now for repairs, it's next going to come out in 2011 because we only repair every four years. So the problem for us is that if there is no carbon price beyond 2012, why would we invest the next time we take that unit out, in a big amendment to that unit, or a big technology upgrade that would reduce our carbon, if we have no confidence that there is a price beyond that?"[18]

- Volatile prices within trading periods also de-incentivise investment. Professor Tom Burke at Imperial College London argues that emissions trading "produces very volatile signals for investors as to what they need to do". He believes that trading will only "affect things at the margin", but far more effective action – involving public expenditure and regulation – would be necessary to make a serious effort against climate change. He said, "the point about markets is that prices change and are volatile as behaviours change. If you want investment made over 30, 40, 50 year periods, then you need a signal that's much stronger".[19]

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[18] BBC Politics Show, 3 June 2007

- While some volatility in phase one was the result of particularly bad allocation because there was little data, the problem of getting the 'right' allocation is also fundamental in many ways, and so volatility is likely to continue.

- **Getting the allocation 'right'.** Setting a target which is neither too tight nor too loose may not be easy. It involves making a series of guesses about future economic growth, future energy prices, and changing technology over a period of several years. If policymakers get it wrong they cannot correct their mistakes until the next period. The negotiations over phase two ETS have demonstrated that bureaucracies are generally not well positioned to judge what caps should be imposed on participants, whilst participants have a strong incentive to exert pressure on the bureaucracy in order to affect these decisions to their advantage.

- **"Gaming the system."** Since emission allocations in the ETS are effectively assets with total values in the order of hundreds of billions of euros (with state action being the key driver of the prices of these assets), it is hardly surprising that lobby group and member state pressure has been intense. Unlike in a single country emissions trading system, in the EU scheme member states have a powerful incentive to set loose caps as this will result in a large transfer payment from member states which set tighter caps.

- One clear example of this was the fierce wrangling over Germany's national allocation plan, which meant that a cut in this country's overall cap was 'traded off' for a much larger allowance of Kyoto credit imports: a 164 million tonne increase.

- **Do you really get a 'single price' for carbon?** The stated goal of the ETS is to reduce economic distortions by having a single price for emissions which ensures that emissions reductions are made in the cheapest way possible. This is obviously not the case at present but even if the EU moved to 100% auctioning within the ETS, the ETS carbon price does not cover the whole economy. The ETS does not even directly cover some large industries, like the production of chemicals, aluminium and minerals, coal mining, natural gas leaks, refrigeration and air conditioning, semi-conductor manufacture, food and drink, or oil and gas flaring. In the case of industries like aluminium it was felt that this would simply shift such production overseas. More importantly, ETS does not cover the majority of the economy: the household sector, surface transport, agriculture etc.

- Although there is discussion about including other sectors there are practical limits to how widely the ETS could be expanded - particularly to the household sector and transport. If the carbon price were high, this incomplete coverage would cause distortions. For example it might become rational to shut down a large, efficient hospital boiler which would be included in the scheme, and replace it with many small inefficient electric fires - which would then not face the ETS carbon price.

- **Avoidability.** Unlike alternative emissions reducing policies (e.g. subsidies for domestic renewables), the ETS would have a serious problem of avoidability even if the carbon price reached a significant level. Firms can move production to just outside the EU and then export their products into the EU having avoided ETS. While some plants and firms are clearly not mobile in this way, others will be.

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[19] BBC Radio 4 Today Programme 7 June 2007

- The report on phase two of the ETS carried out for the Commission by McKinsey suggested that this would be a problem in several sectors. It noted that "The additional costs of about 17% on the marginal unit of steel production may create an incentive to shift marginal production into regions without those costs." It found that "the possibility of production shifts and CO2 leakage in the cement industry is real", and noted that the cost of the ETS to the industry "is roughly equal to freight costs from northern Africa or the eastern European countries outside the EU." For aluminium production, even though it is not covered directly, "the probable large indirect cost increase resulting from the EU ETS is not covered by any free allowances. This might accelerate a migration of primary aluminium to countries with lower electricity cost."

- **ETS interacts with, and may cancel out, other climate policies.** The ETS is not the only climate policy being pursued by governments and indeed it cannot be. Yet its interaction with other tax and subsidy policies has the potential to cancel out their intended effects. If for example, member states subsidise the large scale building of renewable power plants, then the effect will simply be to reduce the price of carbon in the system (and therefore increase emissions elsewhere). The goal of the ETS is to make efficiency gains by avoiding distortions – but other climate policies are at the same time effectively trying to pre-empt the operation of the market and artificially tilt investment in their favour. A whole range of other taxes, subsidies, and regulations mean that the goal of a completely undistorted market may be a mirage.

Don't you need global emissions trading to have effective global action?

- The attempt to create a global carbon market and a "global price for carbon" through trading is unlikely to be successful. International action should focus on setting tough and enforceable national targets for greenhouse gas reduction. How to reach those binding targets should be up to individual countries.

- At present it is proving difficult to even agree the overall targets. Trying to also agree on the policies to meet them would be likely to impede agreement – particularly given that countries like China favour radically different approaches. An intergovernmental agreement is politically a more plausible successor to Kyoto than the creation of a single supranational trading system.

A review of phase one – why the ETS has not cut emissions (2005-2008)

European politicians often speak of the importance of the EU 'taking the lead' on climate change, setting an example to the world by means of what is presented as an ambitious emissions reductions strategy. The EU's Emissions Trading Scheme (ETS) is seen by many as a key vehicle for the achievement of this goal. Former UK Environment Minister David Miliband, for instance, has hailed the ETS as "the most innovative and efficient method yet invented for reducing carbon emissions".[20]

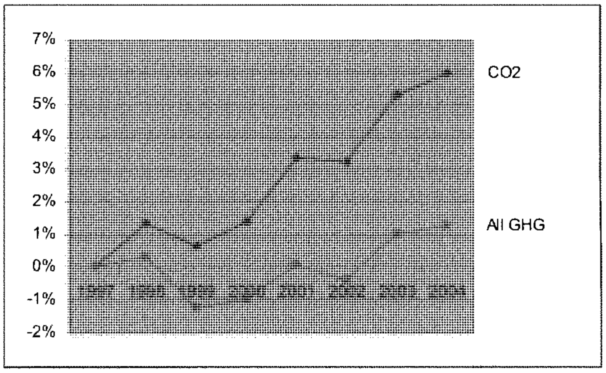
However, it is widely acknowledged that the first phase of the ETS, which runs between 2005 and the end of 2007, has failed to provide either a workable market in carbon, or reduced emissions. Loose targets set by EU members led to an over-allocation of carbon permits – i.e. there were more permits issued than actual emissions.

When the over-allocation became apparent to markets in 2006, EU phase one carbon markets collapsed: the price of carbon plummeted from €30/tonne to €8.5/tonne within 3 weeks from the end of April 2006. The current price of phase one carbon permits, languishing at under €0.2/tonne, reflects little more than the transaction costs of the permits. Franciso Blach, head of commodities research at Merrill Lynch summed up investor pessimism: "There are too many permits, so in reality they should be worthless."[21]

As a result there is no incentive to reduce emissions. Emissions covered by the ETS *rose* 3.6% in the UK in the first year, and rose by 0.8% across the EU as a whole.

Furthermore, large disparities between different member states' targets led to a wealth transfer effect, meaning that countries such as the UK, which set tough emissions caps, were punished, whilst those that set lenient caps were rewarded. Open Europe has estimated that UK firms had to buy £470m worth of permits from rivals in other member states in 2005, whilst no meaningful reduction in emissions has occurred.[22] The ETS covers large industrial installations which account for just under half of all CO2 emissions - 46% of UK emissions, so its failure will have a significant effect on the EU's ability to hit its Kyoto target.

Overall, EU emissions have not been curbed since the Kyoto treaty was signed in 1997. Under current policies the EU-15 will certainly not meet its Kyoto target of reducing greenhouse gas (GHG) emissions by 8% on 1990 levels by 2012. But on current trends, emissions in the EU-15 will have actually increased by 5% by 2030.[23]



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[20] *Guardian* (22.06.06)
[21] *FT* (02.11.06)
[22] Open Europe, *The High Price of Hot Air* (02.07.06)
[23] EC Communication, An Energy Policy for Europe (03.01.07)

Claims that the ETS has led to emissions 'reductions' are misleading and politically driven

- The British government has made no secret of attempting to use the issue of the environment as a means to the end of promoting greater public enthusiasm for the EU "project". Former Environment Secretary David Miliband argued, "Europe needs a new raison d'être. For my generation, the pursuit of peace cannot provide the drive and moral purpose that are needed to inspire the next phase of the European project. The environment is the issue that can best reconnect Europe with its citizens and re-build trust in European institutions. The needs of the environment are coming together with the needs of the EU: one is a cause looking for a champion, the other a champion in search of a cause."[24]

- In this light, the UK government has been keen to promote European level action on the environment, such as the Emissions Trading Scheme, and indeed has even claimed that the first phase of the ETS contributed to 4.6 million tonnes of CO2 reductions in Britain. Miliband has said:

  "The effect of the very first year of the EU ETS is notable. Emissions trading is the most important and effective way of pricing carbon in the economy, which ensures that industry takes full account of the cost of carbon dioxide, and provides a financial incentive for industry to reduce emissions. Carbon trading will increasingly become a key tool in the international community's response to climate change and is already a vital part of the UK's policy response."

- Miliband has also claimed that UK emissions, when ETS is included, were 27 million tonnes less than the actual figure:

  "our greenhouse gas emissions are 15.3 per cent below 1990 levels - 18.8 per cent when the effect of the EU Emissions Trading Scheme is taken into account... With emissions trading, we will almost double our Kyoto target, with an estimated 23.6% reduction in greenhouse gases on 1990 levels by 2010." [25]

- However, as the Commons Environmental Audit Committee points out, such statements are highly misleading, as there is little evidence that the ETS has led to any reductions at all:

  "...the Government announced that the UK's National Allocation Plan was imposing a reduction on Business As Usual levels; for Phase I this was stated to be a cut of 8% or 4.6MtC. However, as we have seen, there is little or no evidence that Phase I is leading to any cutbacks in actual emissions at all, whether in the UK or elsewhere in the EU. Rather, it would seem that where UK-based firms have exceeded their allocations and bought allowances on the market, this has largely come from the general excess of allowances in Phase I; or in other words, they are simply buying "hot air"... the Government itself recognises that, while it did indeed impose a cap on UK installations at a level roughly 4.6MtC below Business As Usual projections in Phase I, this shortfall is essentially being made up by buying hot air – i.e., the overall

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[24] Miliband D. "Towards an environmental union", October/November 2006 – *Centre for European Reform Bulletin* (Issue 50)

[25] Defra Press Release (31.01.07)

surplus of allowances allocated to industries in excess of need – and is not actually reducing CO_2 emissions at all.'[26]

- The Committee argue that "If it is indeed the case that these 'savings' are entirely notional – in other words, that they simply reflect a cutback from Business As Usual projections, and have not actually made any impact on UK emissions in reality – the Minister must explain why he failed to make this clear in his evidence to us; and the Government should immediately stop using this figure, and issue corrections to all official uses of it."

- The Government has said that the ETS is "the cornerstone of the Government's policy framework to tackle climate change."[27] Clearly, a great deal has been staked on the success of this policy instrument.

- The Committee go on to note that, bearing in mind the "political capital" the government have made in promoting the contribution of the EU ETS towards the UK's emissions reduction targets, "the Government has a democratic duty to be more transparent in its reporting of progress against this and future targets. As it stands, presentation of the UK's progress towards its carbon reduction targets is apt to mislead."[28]

Will there be any improvement in phase two of ETS? (2008-2012)

- Phase two of the ETS begins in 2008, running through to 2012. The Commission is trying to avoid the problems of phase one through attempting to enforce more stringent caps, intended to create scarcity in carbon supply and thereby incentives to reduce emissions. Miliband argues that, "The first phase of the EU ETS was designed as a learning phase, and important lessons have been applied to the second phase. The European Commission's decisions on Phase II National Allocation Plans show a clear determination to ensure scarcity in the carbon market and to use the ETS to drive down carbon dioxide emissions in line with the EU's Kyoto targets."[29]

- However, the potential 'reductions' in emissions are unlikely to provide the implied necessary level of *domestic* abatement they suggest. In fact, most or all of the "reductions" will be bought in from outside the EU. The lack of long term price signal – a fundamental flaw in the present ETS system – is likely to mean that if carbon abatement does occur, this will not contribute significantly towards reducing the overall carbon intensity of European economies, but rather will rely on purchased 'carbon credits' imported from outside the EU.

- Other regions are watching the ETS carefully as an example for their own possible policy implementations in combating climate change, particularly given the imminence of post-Kyoto negotiations. Unfortunately, the second phase of the Scheme – on account of not sufficiently incentivising longer-term low carbon investment in Europe – is unlikely to persuade other large emitters to follow suit.

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[26] House of Commons Environmental Audit Committee, Second Report, *The EU Emissions Trading Scheme: Lessons for the Future* (01.03.07)
[27] *Ibid.*
[28] *Ibid.*
[29] *FT* letter (30.04.07)

Not cutting our emissions – but paying for "reductions" outside the EU

- The 2004 Linking Directive allows certificates of emission reductions from emerging economies to be traded within the European carbon market, the so-called "flexible mechanisms" of the Kyoto Protocol. The Kyoto Protocol requires developed countries that have ratified the text to reduce their greenhouse gas emissions by an average of 5% on 1990 levels by 2012. The joint target for the EU-15 as a whole is 8%. Commitments towards meeting Kyoto reductions not achieved through domestic emissions abatement in the developed (or 'Annex 1' countries) will be taken up by importing Clean Development Mechanism and Joint Implementation (CDM/ JI) permits from developing and middle income countries ('non-Annex 1' states). "Certified Emissions Reductions" (CERs) for CDM projects, or Emissions Reduction Units (ERUs) for JI projects, are awarded for projects in non-annex 1 countries according to the amount of greenhouse gas emissions they avoid as a result of the project. The credits are then sold to governments and companies in Annex 1 countries, and count towards their required Kyoto emissions reductions.

- When the Linking Directive was originally proposed, a cap was placed on the number of Kyoto credits that could be imported into the ETS. This would originally be set at 6% of the total cap (meaning just 25% of *reductions* would be achieved outside the EU). The Commission introduced this provision in order "to ensure supplementarity under the Kyoto Protocol in respect of the Community scheme and to preserve the overall objective of the Community scheme to achieve emission reductions within the EU".[30] However, the principles behind the cap quickly became undermined by the pressures of legislating to timetable and lobby group influence, as Natalia Gorina and Alexandre Marty at consultancy ICFI explain:

  "*The rationale for this cap was the so-called 'supplementarity' principle, the requirement that most of the overall reduction target is met through domestic action and the remainder through Kyoto mechanisms. However, the 'cap proposal' was subject to strong criticisms. Environmental NGOs battled for no linking at all as it would discourage domestic emissions reductions, while industrial associations demanded no cap on carbon credits, as this would reduce the cost-efficiency of the ETS. A compromise needed to be struck quickly, before the European parliamentary elections in June 2004 and to make the Linking Directive operational for the start-up of the ETS in January 2005. The easiest and quickest compromise was to delegate the cap decisions to member states. That compromise led to what we see now: complexity and market fragmentation, in which the commercial implications are not immediately obvious.*"[31]

- As Greenpeace argues, this issue is not purely of commercial significance, but a potential threat to the environmental integrity of the ETS: "The only way that the EU can send positive political signals internationally is by demonstrating that it intends to deliver real emission reductions at home and to protect the environmental integrity of the Kyoto Protocol. International negotiations and the climate have nothing to gain from the new loopholes that [the Linking Directive] is creating."[32]

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[30] EU Commission, *Staff working paper on the directive of the European Parliament and Council amending Directive establishing a scheme for greenhouse gas allowance trading within the community, in respect of the Kyoto Protocol's project-based mechanisms* (23.07.03)

[31] Gorina, N. & Marty, A. "Trading around the caps" *Environmental Finance* (November 2006)

[32] Greenpeace, Position Paper, "Seven reasons to reject the Linking Directive" (24.10.03)

- Although the EU Commission has been keen to emphasise the setting of 'tougher' national targets for phase two, these are not as ambitious as they first appear on account of the generous allocation of Kyoto credits. Comparing the cap set in phase one and that set in phase two against 2006 verified emissions data indicates that, although scarcity will be higher in phase two, the net required *domestic* emissions reductions will be very small or non-existant. Of course, further EU domestic reductions may occur as 'business as usual' emissions increase , but the overall result would only be to offset this rising business as usual baseline, much (or all) of which could be covered using imported credits.

- Despite the principle of supplementarity, there are in practice very limited constraints on the quantities of Kyoto credits that can be imported to the EU. We estimate that the total entitlement for Kyoto credits for the ETS is more or less equal to the likely overall scarcity, meaning that the entire shortfall could be covered by project credits if supply of these were high enough.[33] The World Bank notes that "The Commission assessed NAPs for imports of carbon assets (including planned and substantiated governmental purchases) ostensibly with a view to limit imports to no more than 50% of the 'expected distance to target' for each Member State. According to the vast majority of analysts, this does not place any practical constraints on the demand for CDM/JI from EU installations." Given analyst estimates of numbers of credits that are likely to be imported into the scheme (1,000 to 1,200 MtCO2e over 2008-12), the lack of restrictions on imports "means that installations, using credits from CDM and JI, could be in a balanced position or a marginally short one."[34]

- In a more recent analysis piece, Kjetil Røine, Manager at Carbon Market Research at Point Carbon predicted that all of the scarcity created in phase two could well be covered through imported credits. He argues that the supposed limits on external credit use in the phase two NAP will probably not be relevant: "we do not expect that the credit limits will be the constraining element for the CER/ERU inflow to the EU ETS... holding all other factors constant, the CER/ERU supply to the EU ETS could be up to 1,300 Mt... This makes the conclusion that there will be sufficient CER/ERU supply to meet the EU ETS demand even more robust." He concludes that – depending on how events play out in the run-up to 2013 – "there seems to be nearly sufficient supply of credits to meet the estimated shortage in the EU ETS over the first Kyoto period [which coincides with phase 2 ETS]".[35]

- The supplementarity principle exists in order to ensure the developed world takes responsibility in tackling climate change – working on the basis that because industrialised nations have historically been the biggest polluters, they should be the ones to take the lead in tackling climate change. This principle has been seriously undermined by the EU's current policies, effectively allowing Europe to shirk its responsibility to reduce domestic carbon intensity and absolute emissions levels. This section will explore how linking the EU ETS with the Kyoto trading mechanisms has created significant market uncertainty, as well as introducing the risk of an oversupply of credits into phase two, decreasing the pressure for real emissions reductions in Europe.

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[33] If total scarcity is 1,400Mt, this could almost be entirely covered by around 1380Mt of credits eligible for import.

[34] World Bank, *State and trends of the carbon market 2007*

[35] Røine, K."CDM/JI supply: Will there be enough?", *Carbon Market Europe*, Point Carbon (1 June 2007)

i) Will 'hot air' from Russia undermine carbon markets?

- Because Russia and a number of other former Soviet bloc countries experienced recession and a large number of industrial shutdowns in the period following the collapse of communism, their emissions were far below the 1990 baseline when they ratified the Kyoto Protocol in 2004. As their Kyoto commitments are generally to hold emissions level relative to that baseline, or to make only modest reductions, this in practice gives these countries a surplus in terms of their 'right to pollute' – this has become known, rather notoriously, as 'Russian hot air'. Since International Emissions Trading, enshrined in the Protocol, allows signatories to trade their surplus emissions with one another, this could prove to be a significant factor affecting the emerging global carbon markets – to which the EU ETS is linked.

Kyoto credit supply and demand (Jepma 2007)	
Projected supply	**5.75bn**
CDM	2.90bn
JI	0.15bn
AAUs (restricted sale)	2.70bn
Projected demand	**3.50bn**
Net surplus of credits	**2.25bn**

- Edwin Woerdman of the University of Groningen notes that "it is well-known that 'hot air' will be traded under the Kyoto Protocol, which is considered to be one of the most important effectiveness problems of emissions trading systems. If the official emission ceiling in a country is higher than its business-as-usual emissions, it can sell pollution rights without having to reduce emissions. The trading of this hot air not only was, but still is seen as an environmental problem by various scientists, policymakers and NGOs."[36]

- Writing in April 2007, with the shape of phase two coming into clearer focus, Professor Catrinus Jepma of Amsterdam University argued that the 2008-2012 Kyoto commitment period will be "characterised by a structural oversupply of credits" on account of the estimated influx of some 2.7bn tonnes of Assigned Amount Units (AAUs) from the former Soviet bloc. He said that "This can only lead to potentially volatile, but eventually low, if not very low, credit prices during the commitment period of the Kyoto Protocol. If this would happen, the Kyoto Protocol can, with hindsight, be characterised as a lost climate policy decade during which the opportunity to put a serious price on GHG emissions has been missed."

- Jepma explains how this oversupply of credits risks 'spilling over' into the EU ETS, noting that restrictions on CDM and JI use in the EU are far too lenient to prevent market dilution: "Sadly enough, the Linking Directive rules for the EU ETS second phase are such that the expected net demand under the EU ETS scheme can easily be met through JI and CDM credits (in fact, the accepted limits to using JI and CDM credits under the ETS are so wide that most installations can most likely cover any deficits through these credits). Through the Linking Directive, low credit prices under the Kyoto Protocol will push down second phase EU ETS prices. Also for the EU the opportunity to put real prices on carbon will then be lost."

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[36] Woerdman, E. 'Hot Air Trading under the Kyoto Protocol: An Environmental Problem or Not?', *European Environmental Law Review* 14 (3), pp. 71-77. (2005)

- Jepma suggests that this situation has arisen as a result of attempts to secure political agreement amongst EU member states, who were keen to secure rights to cheap imported credits, rather than having to make potentially costly reductions at home: "The linking directive was clearly a political compromise to enhance acceptance of the EU ETS."[37]

- Woerdman believes that the environmental compromise at Kyoto was also the product of political maneuverings, and was seen by EU negotiators as a necessary sacrifice, intended as a "bribe" to secure Russian ratification of the symbolically important Protocol: "the withdrawal of the US from the Kyoto Protocol changed the game and seems to have increased the acceptance of hot air by the EU and the green NGO community as a 'necessary evil' to keep Annex B Parties such as Japan and the Russian Federation on board of this international environmental agreement...EU officials have more or less accepted that hot air will be traded as a 'bribe' for ratification by hot air countries such as the Russian Federation."[38]

- Some believe that it is unlikely, however, that the former Soviet states will simply flood the market with all their excess AAUs. Natalia Gorina of ICF Consulting estimates that there are 5.3bn tonnes of surplus emissions credits potentially available from these countries for the 2008-2012 period: "if all available hot air enters the market, AAU supply would outstrip global demand for carbon instruments and the price of AAUs would fall to zero." She argues that "This scenario is unlikely, however, because this would result in hot air sellers receiving low or no revenue from AAU sales. Instead, they would be likely to act strategically by selling a restricted amount of AAUs and by banking some for the post-2012 period. The model shows that hot air countries would maximise their revenues by selling around 20–30% of their surplus AAUs in the market, depending upon the demand-side scenario."[39]

- Nonetheless, if this scenario of restricted sales were to come about, supply of credits from the former Soviet states would still be in the region 1-1.6bn tonnes – a very significant dilution in global carbon markets.

- Other than the risks of an oversupply contributing to very low carbon prices, sellers of AAUs also face an obstacle in that many governments will not agree to buy hot air, conscious that such a move would be politically damaging. Canada and many large European government buyers (including Germany and the Netherlands) have said they are unwilling to spend taxpayers' money on hot air. However, Kyoto compliance is still a pressing concern for most of these governments (although Canada is wavering on its Kyoto commitments) meaning there are other options that have been considered for 'greening' Russian hot air, discussed in the box below.

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[37] *Joint Implementation Quarterly* (April 2007)

[38] Woerdman, E. (2005), "Hot Air Trading under the Kyoto Protocol: An Environmental Problem or Not?" *European Environmental Law Review* 14 (3), pp. 71-77.

[39] Gorina, N. "Cooling down hot air", *Environmental Finance* (May 2006)

'Greening' Russian hot air: a source of credit supply?

a) Green Investment Scheme (GIS)

The Green Investment Scheme essentially works by earmarking funds used for the purchase of AAUs for investment designed to curb emissions. Both Russia and Ukraine are actively pursuing the GIS option. By 2010 Russia expects to have implemented its first GIS deals. Japan, Italy and other European countries have expressed interest in GIS deals with Ukraine and Russia. GIS credits cannot be used directly in the EU ETS.

b) Joint Implementation (JI) Track 1

Another option for greening AAUs is the use of 'Track 1' of Kyoto's Joint Implementation mechanism (JI Track 1). Whilst those countries that have not met certain UN eligibility criteria will be required to adhere to the Track 2 procedures, which are similar to the more rigorous procedures for CDM projects, others, such as Russia, can make use of Track 1, where verification is far less stringent, and does not have to be conducted by an accredited third party. Although such projects need to substantiate additionality[40], Track 1 leaves much more up to the host nation. JI credits are eligible for direct use in the EU ETS.

Russia has the largest estimated potential of the development of JI credits, but projects have been halted because Moscow has yet to adopt the domestic legal framework for how to approve projects. This legislation is expected to be in place soon, which has caused European and Japanese firms to cast their eyes on the Russian JI market.[41]

- Russia will seek to engage in the potentially lucrative global carbon markets. Gazprom has announced that it will seek to sell carbon credits to European buyers, effectively in order to offset the carbon produced by the Russian gas they are using. It is even considering selling gas and carbon credits as a 'package' to customers in the west.

- In January 2007, Gazprombank, part of the Gazprom Group, and Dresdner Kleinwort announced a joint venture investing in emissions reductions projects, which analysts estimate could potentially generate up to 1bn tonnes worth of credits. Should such quantitites materialise, this would put significant downward pressure on the price of carbon in the ETS.

- Many Russian industrial plants are very old and carbon intensive, meaning that even modest (and therefore cheap) technological improvements can yield great reduction in carbon emissions. Gazprom believes it can exploit such techniques to add value to natural gas sales to European firms. Point Carbon estimate that Gazprom has the potential to reduce its emissions by fixing leaks and overhauling its compressors, which could generate up to €2bn through carbon credits.[42] Philip Dewhurst, a spokesman for Gazprom Marketing & Trading, comments that "Russia is the Saudi Arabia of carbon. There is a tremendous bank there. Gazprom is in this business for the long term."[43]

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[40] Additionality is a key condition for Kyoto projects stating that the improvement would not have taken place without the additional investment.

[41] *Point Carbon* (27.04.07)

[42] *FT* (16.01.07)

[43] *IHT* (25.04.07)

- Even if there is not a large supply of credits from Russia, it is possible that the Kremlin can still use this to its strategic advantage. If ETS participants cannot use Kyoto credits to comply with their targets, this may force the market to choose the next cheapest option for registering emissions reductions: coal to gas switching. However, if coal to gas switching is triggered, gas dependency on Russia will be increased.

- The ability to generate cheap carbon credits is therefore effectively another strategic asset at the Kremlin's disposal. Gazprom and the Russian state have considerable sway over supply of both carbon and natural gas to Europe. A great deal may depend on the extent to which Russia can persuade Ukraine and other smaller 'hot air' countries to fall into line in imposing cartel-like control on carbon supply, effectively organising a 'carbon OPEC'. If the Kremlin is unable to do this, the scenario of hot air oversupply becomes more likely.

- In the longer term, emissions targets for 2020 set out by the EU will contribute further to gas dependency, strengthening the hand of the Russian state. As a recent report for the EU Commission by McKinsey and Ecofys noted, "In order to keep emissions in the power sector constant until 2020 – which is a rather conservative assumption and probably not strict enough – a massive shift is needed from coal to gas fired electricity production." At a carbon price of €20 a tonne, the study predicts that the EU ETS will have increased the EU's imports of gas by just under 30% by 2020. The report for the Commission predicts that the share of the EU's electricity generated by gas-burning power stations will go from 23% in 2005 to 45% in 2020.[44]

ii) The oversupply of Kyoto credits; Canadian reluctance to comply with Kyoto could create problems for the ETS

- US withdrawal from the Kyoto Protocol led to a sharp diminution in potential demand for emissions reduction credits. Canada now looks to be following suit, albeit in a more partial and ambiguous manner. On April 27 2007, Ottawa announced that it would adopt unilateral carbon intensity-based targets, and separate targets for absolute emissions reductions of 150Mt by 2020. The proposals would mean that Canada will not meet its Kyoto targets. Although Canadian firms will be able to use Kyoto credits for compliance, this demand is not expected to materialise before 2010 and is likely to remain small. If Canada was to comply with Kyoto, this would contribute to demand for at least 1bn tonnes of credits over the Kyoto commitment period, according to Point Carbon,[45] meaning that its exit could be a major loss.

- It is unclear how the Canadian proposals can be reconciled with the Kyoto mechanisms, in any case. Per Lekander, an analyst at UBS, believes Canada could have problems participating in CDM without achieving the Kyoto target during the 2008-2012 compliance period. "Either you buy the whole bag or you are not in," he said.[46]

- Yvo de Boer, Executive Secretary of the UN body that oversees the Kyoto Protocol, said there was some confusion over Canada's commitment to Kyoto, and subsequent international agreements: "The question is how this new commitment or the new policy objective relates to the international commitment or international undertaking Canada has made with the Kyoto Protocol, and also how it fits into the debate about longer term action that's currently under way".

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[44] McKinsey& Ecofys, EU ETS Review, Report on International Competitiveness (December 2006)

[45] *Point Carbon* (01.05.07)

[46] *Point Carbon* (01.05.07)

- Given that a change in government in Ottawa could potentially shift Canadian policy on Kyoto yet again (the opposition Liberal Party are vigorously opposed to the government's plan), it seems clear that this situation creates considerable uncertainty on the demand side for Kyoto credits. Since this potential Canadian demand for credits would be effectively competing with demand from the EU ETS (as a result of the Linking Directive), reduction in the former can only lead to lower prices for carbon, and lower levels of domestic abatement in the EU. On the other hand, increased Canadian demand will mean higher carbon prices in the ETS.

iii) Even if Kyoto credit supply remains small, and demand is high, the majority of EU 'reductions' would still be imported

- Even if we work on optimistic grounds – assuming that there is no oversupply of credits from the former Soviet states, and that there will be relatively strong government demand for credits – we predict that only 300-370Mt in CO2 reductions will occur in the EU over the 5 year trading period as a result of scarcity created by emissions trading.[47] This compares with imports of Kyoto credits of around 1000Mt.

- The estimates under this optimistic scenario suggest that just a quarter of emissions 'reductions' would actually occur in the EU. The fact that the remaining commitment, representing the majority of supposed emissions reductions, would be taken up by Kyoto credits clearly goes against the agreed principle that emissions reductions outside Europe should be merely "supplementary" to those within Europe.[48] The UK government freely admits that the majority of reductions will be achieved outside the EU. Ian Pearson, former Minister for Climate Change and the Environment noted in regard to the second phase of the scheme that "What we are saying though, within the overall level of effort, is that one third of the effort will have to come from within the scheme itself and only a maximum of two thirds will come from outside the scheme through the Clean Development Mechanism."[49] The Government later said the UK's 8% limit on project credits "represents around two-thirds of the difference between business as usual emissions and the total cap (ie. the level of effort in the UK), thereby balancing the need for domestic action with the benefits of investing in overseas projects."[50]

- Offsetting European emissions with Kyoto credits does not necessarily provide an absolute reduction in global emissions, as these external permits give credit to avoidance of emissions, rather than a finite cut on existing levels. If we accept the reality of rapid economic growth in many developing countries, it is reasonable to also accept that emissions there will necessarily increase.

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[47] The World Bank's *State and trends of the carbon market 2007*, after conducting around 50 interviews with carbon market players, notes that "There is a consensus emerging among market analysts that the expected shortfall in the EU ETS Phase II is likely to be in the range of 0.9bn to 1.5bn tCO2e." Our predictions put the shortfall at around 1.4bn tonnes, thereby making an above average projection for expected scarcity. The World Bank also believe that Kyoto credit supply will be between 1-1.2bn tonnes – we assume a lower-range supply of around 1bn. Both of our assumptions push the level of required abatement higher.

[48] As outlined in the 2001 Marrakech agreement: "the use of the mechanisms shall be supplemental to domestic action and that domestic action shall thus constitute a significant element of the effort made by each Party". Decision 15 of the Conference of the Parties 7th session (15/CP.7)

[49] Ian Pearson, Evidence to Environmental Audit Committee (12.12.06)

[50] Government Response to the Environment Audit Committee, Second Report of Session 2006-07, The EU Emissions Trading Scheme: Lessons for the Future

- Given that emissions in Europe are still exhibiting an upward trend (projected to continue on current policies), moving towards a low-carbon economy – which requires a fundamental systemic shift in the continent's industrial base – should lie at the root of climate change policy in Europe. The current ETS does not address this central concern, as such limited domestic reductions (achieved through coal to gas switching in power-generation) can only offset the trend path of increasing emissions.

- WWF argues that:

  "Access to significant volumes of cheap credits from overseas could disincentivise investment in clean technology development in the EU and slow down innovation. It also raises concerns regarding the polluting nations of the north transferring responsibility for tackling climate change to the developing world - and is in clear breach of both the Linking and the ETS Directives. These require that any use of project credits must be supplemental to domestic action e.g. that a significant proportion of the effort required to reduce emissions, which could be taken to mean 50% or more, should take place at home."[51]

- The Commons Environmental Audit Committee notes that this EU-wide trend will be reflected in the UK context:

  "...the Minister was keen to point out that the Government was limiting the use of CDM and JI credits within the UK NAP. Indeed, their use will be limited, to 8% of the UK's total cap. However, this is still a significant amount, representing some 5.3MtC[52]*; and this figure has been worked out by the Government specifically because it corresponds to two-thirds of what it describes as "the effort in Phase II", or in other words the cutback of 8MtC from BAU projections.*

  To be clear, then, the Government is allowing for, and expecting, two-thirds of the headline carbon savings it has announced as resulting from Phase II to take place, not just outside the UK, but outside the EU – and probably in the form, not of carbon dioxide, but of carbon-equivalent greenhouse gases. In fact, the effects of such credits on UK installations will – indirectly – be even higher than this, because other Member States have set higher limits on the use of such credits within their National Allocation Plans."[53]

- **The Committee goes on to say that "it is theoretically possible the EU ETS might not be responsible for any emissions reductions within the UK at all." The Government's response to the Committee report states that "The Committee's theoretical observation is correct".**[54]

- Kyoto credits should (in theory) help emerging economies develop in a less pollution intensive way. However, they are open to widespread abuse – diluting EU carbon markets, often without contributing to combating climate change – and are more environmentally costly than EU emissions trading credits, which only reward *absolute* cuts in emissions. The environmental standards applied to the issuance of Kyoto credits, together with the large volumes available to EU polluters, constitute a significant weakening in the environmental effectiveness of the Emissions Trading Scheme, as described below.

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[51] WWF, *Use of CDM/JI Project Credits by participants in Phase II of the EU Emissions Trading Scheme – A WWF summary of the Ecofys UK report* (November 2006)

[52] This is equivalent to 19.14Mt of CO2 or CO2 equivalent, the UK's Kyoto credit import limit.

[53] House of Commons Environmental Audit Committee, Second Report, *The EU Emissions Trading Scheme: Lessons for the Future* (01.03.07)

[54] Government Response to the Environment Audit Committee, Second Report of Session 2006-07, *The EU Emissions Trading Scheme: Lessons for the Future*

Why Kyoto project credits will undermine domestic action but won't deliver clean development

- The IPPR has already highlighted the potential problems associated with a "leaky" carbon market under the EU ETS, caused by the introduction of CDM/ JI permits from outside the EU.[55] CDM/ JI projects give credit for emissions that are avoided (ie. reduced below the level that would have otherwise occurred), not necessarily for absolute emission reductions. These projects often do not translate as concrete investments in renewable energy – in fact, only one quarter of credits generated from the CDM before 2012 are expected to be from renewables, and only 2% of credits so far issued originate from such schemes.

- The central idea behind Kyoto permits is that they should help emerging economies develop in a less pollution intensive way, channelling investment from the developed world towards pro-development, sustainable projects. The mechanism is also designed to allow the economics of emissions reductions to be played out on a global level, encouraging the process of emissions cuts to take place wherever costs are lowest.

- Large demand for Kyoto credits is expected to be created by the Emissions Trading Scheme. Many credits will also be bought up by non-EU ETS players, such as national governments in the EU, Japan and Canada, as this process contributes towards their meeting of Kyoto targets. As governments find it increasingly difficult to hit Kyoto targets, they will increasingly come to rely on buying up credits from overseas.

- CDMs and JIs may have some positive effects together with many negative features (discussed below). In any case, the large numbers of such permits admitted to phase two of the ETS nonetheless risk providing an overall disincentive to longer-term investments in low carbon technology within Europe.

i) Kyoto projects are often harmful in environmental terms

- Project based Kyoto measures have come under strong criticism on the basis of their lack of "additionality", and for harming the environment in other ways. Additionality refers to the principle whereby a project should be entitled to CDM status on the condition that it would not otherwise take place without the funding provided by carbon trading. The Jindal metal plant in India, the largest sponge iron plant in the world, is an example of a programme claiming carbon credits for technology that would have been installed anyway. The company (JSPL) is planning further expansion, a process which has drawn accusations of land-grabbing, as well as causing intensive air, soil and water pollution in the local area. Kevin Smith of Carbon Trade Watch argues that "The CDM is not only providing financial assistance to JSPL in making this expansion, but also providing them with green credibility for being at the forefront of the emerging carbon market."[56]

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[55] Gibbs, T. & Retallack, S. *Trading up – reforming the European Union's Emissions Trading Scheme*, IPPR (December 2006)

- Axel Michaelowa, an advisor to the CDM board, claims that around one third of the 50 projects he surveyed in India were not "additional", and therefore should not have been eligible for carbon credits. Despite having warned the board of his concerns about Jindal's activities, the board still approved the projects. Another example is the Xiaogushan dam in China. The project was awarded US$30m worth of credits, even though construction of the dam had been long underway, was nearing completion and had already been given loans by the Asian Development Bank. In this way, CDM credits can be sold into the ETS, driving down carbon prices, even if the related projects are not contributing to "additional" emissions reductions. Without additionality, investment in such projects is effectively subsidising more pollution in the developing world, whilst allowing firms in the developed world to increase their own pollution at low cost.

- Patrick McCully, Executive Director of environmental NGO International Rivers Network argues, "the UN panel that governs the scheme is being deceived by developers and consultants into giving away many millions of credits to schemes that would very probably have been built anyway, and so do not avoid any carbon emissions. Worse, these credits will then be 'cashed in' by their European and Japanese government and corporate buyers, allowing them to avoid their commitments to reduce their own emissions."[57]

- An investigation for the Guardian cited a "senior figure" in the CDM process who estimated that up to 20% of the carbon credits being generated through the mechanism were faulty. This does not just include concerns over additionality, but instances of "conjuring up numbers when projects on the ground failed to provide them", and problems with incompetence and possible abuse amongst validating and verifying companies. A separate investigation for Down to Earth magazine suggested that a major UK accounting firm, Ernst and Young, had produced highly flawed formal reports on projects in India. There are also problems with projects trapping landfill gas (the third biggest CER generator), as it is tempting to exaggerate how much methane a pile of rubbish is producing. [58]

- There are further examples of CDM projects which, whilst complying with criteria on emissions, contribute to other forms of non-sustainable environmental degradation, such as soil and water pollution. The environmental case for large dam projects is also a matter of some controversy, given their often disruptive and negative effects on water resources.[59] Dams are believed to contribute to around 4% of the total warming impact of human activities (higher than annual carbon dioxide emissions from the burning of fossil fuels in the US), yet are still eligible for Kyoto credits.[60]

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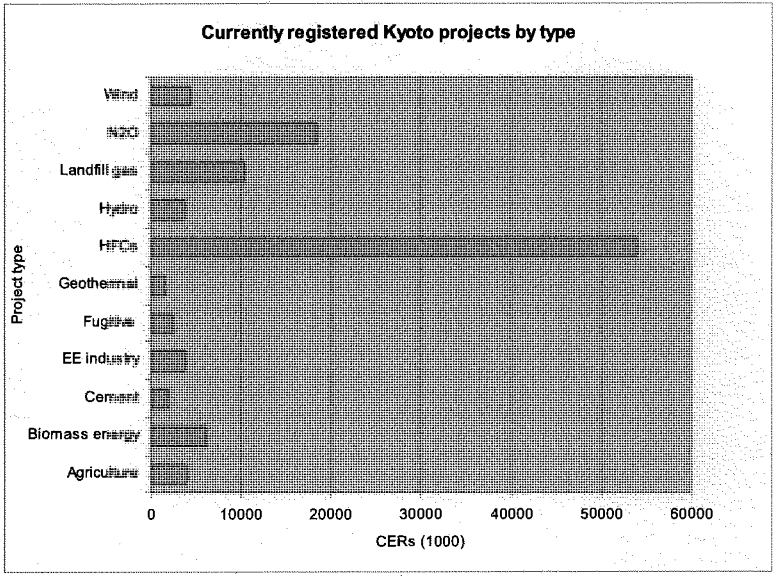
[56] Smith K, "Pollute and Profit", Parliamentary Brief Magazine (May 2007)
[57] Letter to *FT* (13.02.07)
[58] *Guardian* (02.06.07)
[59] Channel 4 news bulletin (07.02.07); reported by *Point Carbon* (06.02.07)
[60] Point Carbon (10.05.07). The emission of methane from large dam projects occurs as a result of decomposing organic matter in reservoirs.

ii) Serious loopholes create massive distortions in carbon markets, divert investment from green technologies, and do not aid development

- The Kyoto permit system awards funding on the basis of quantity of C02 equivalent reductions achieved, but often this is not related to the true cost of making those reductions. A particularly striking example, revealed in a study in *Nature*, relates to chemical factories producing the HFC-23 gas. These installations can reduce their emissions with a simple piece of equipment known as a scrubber, which generally costs a few million dollars. However, since HFC-23 is so potent (one tonne of the gas being equivalent to 11,700 tonnes of carbon dioxide) companies that install this equipment are eligible for tens of thousands of carbon credits for reducing just a few tonnes of the gas.



- This means that HFC-23 projects have received more credits than any other in the carbon markets so far. Total projects that should have cost no more than €100m have wasted €4.6bn.[61]

- The author of the study, Michael Wara, suggests that this loophole creates perverse incentives to produce even more of this gas, and there is evidence to suggest this has already happened: "HFC 23 emitters can earn almost twice as much from the CDM credits as they can from selling refrigerant gases – by any measure a major distortion of the market."[62] The development gains of such large scale 'end of pipe' capture of gases are very limited, delivering no real benefits in terms of improvements in energy supply, job creation or infrastructure. As the graphs[63] show, HFC capture projects are currently the largest single source of registered CERs, and will remain so over the course of the Kyoto commitment period. If HFCs and other 'exotic gas' capture projects are aggregated, these account for 67% of currently registered CERs, and will account for 38% of all CERs generated up to 2012, compared with figures for renewables of 20% and 25% respectively.

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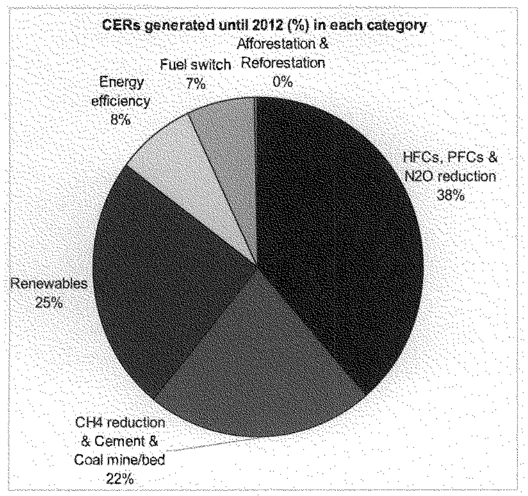
[61] *FT* (08.02.07)

[62] Wara, M. "Is the global carbon market working?" *Nature* (vol 445, p 595) 8 February 2007

- The necessary money could have been provided by other funders (such as development banks or aid funds) in the first place, and the wasted money invested far more efficiently on renewable energy projects. To make matters worse, the unecessarily large numbers of extra credits awarded for HFC-23 projects will further dilute European markets. The UN, reacting to reports of big profits, has now ruled that only HFC factories built before 2004 can qualify for CDM investment. However, an investigation by the FT has shown that the investors have simply shifted their focus to nitrogen oxides (NOx), another potent greenhouse gas, 310 times more powerful than C02. In 2006, hardly any NOx projects were registered, but by September 2006 they accounted for about 11% of the emissions credits set to be issued.[64]



- The eligibility of such projects under the CDM effectively provides another subsidy mechanism for large-scale polluters in the developing world, enabling them to expand further and pollute more. In the 2006/07 financial year, SRF, an Indian industrial and textiles company based in India, made €87m from the sale of carbon credits, generated through HFC-23 destruction. Ashish Bharat Ram, the managing director, told the Economic Times that "strong income from carbon trading strengthened us financially, and now we are expanding into areas related to our core strength of chemical and technical textiles business".[65]

- The Commons Environmental Audit Committee argues, in reference to the issue of "exotic gases", that "Despite [this type of project] being allowed both under Kyoto and under the ETS Directive, we have for some time heard compelling evidence to suggest that the worth of some of the projects financed under these Kyoto mechanisms should be subject to serious doubt."[66]

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[63] Fenhann, J. UNEP Risø Centre (01.02.07)

[64] *FT* (27.04.07)

[65] Smith, K. "Pollute and Profit", Parliamentary Brief Magazine (May 2007)

- Michael Wara gives his overall assessment of the CDM system:

  "...*the CDM has primarily proffered an exchange of CO2 reductions in the developed world for reductions of various non-CO2 gases in the developing world. Furthermore, because the price paid for reductions has become tied to the major developed world cap and trade market, the European Union Emissions Trading Scheme ("ETS"), a CO2 only market, the price paid is between 10 and 100 times greater than the cost of most of these reductions...The CDM is neither functioning well as a market for emissions reductions nor is it a successful subsidy. As a result, it is creating skewed but powerful political institutions and interest groups whose interests are not aligned with the ultimate goals of either the UNFCCC or the Kyoto Protocol...The CDM fails as a market because it has animated accounting tricks that allow participants to manufacture CERs at little or no cost. It fails as a subsidy because the developed world has had to purchase these emissions reductions at an extremely high premium that bears no relation to their cost. The CDM, even as it is supplying CERs to developed world parties to the Kyoto Protocol at prices that are less than they would otherwise have to pay, is an excessive subsidy that represents a massive waste of developed world resources."*[67]

- The scale of Kyoto project investment is immense. The current pipeline is expected to yield around two billion tonnes worth of credits, the value of which would equate to around €20bn at current market prices.[68] Looking at individual projects, a single HFC capture scheme in India[69], which has attracted a consortium of European investors including Shell, EDF, Barclays, BNP Paribas and Enel, is set to generate 32.6 million tonnes of credits before 2012. This is roughly equivalent to the total annual emissions of Austria in sectors covered by the ETS; it would cover the annual shortfall of Italy, if we work from the basis of 2006 verified emissions against the current cap. The biggest CDM project of all is the Zhonghao New Chemical Materials plant in China[70], also based on HFC capture, which will generate nearly 70 million tonnes worth of credits up to 2012. This is equivalent to the total annual greenhouse gas emissions of Sweden. 53% of all existing CERs come from six enormous projects engaged in HFC 23 destruction. [71]

- China, where most of the world's HFC 23 production is located, has imposed a 65% tax on this type of project, effectively meaning that CER purchasers in the west are contributing to the Chinese government's coffers. "It is estimated that China could generate CER credits of between 150 to 225 million tons of carbon dioxide equivalent per year," says Anthony Maxwell, an Environment Specialist at the Asian Development Bank. "This represents a potential annual revenue stream of up to

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[66] House of Commons Environmental Audit Committee, Second Report, *The EU Emissions Trading Scheme: Lessons for the Future* (01.03.07)

[67] Wara, M. "Measuring the Clean Development Mechanism's development and potential" Working paper # 56, Stanford University (July 2006)

[68] Point Carbon's CDM & JI Monitor (May 2007) notes a price for primary CERs of €9-11.

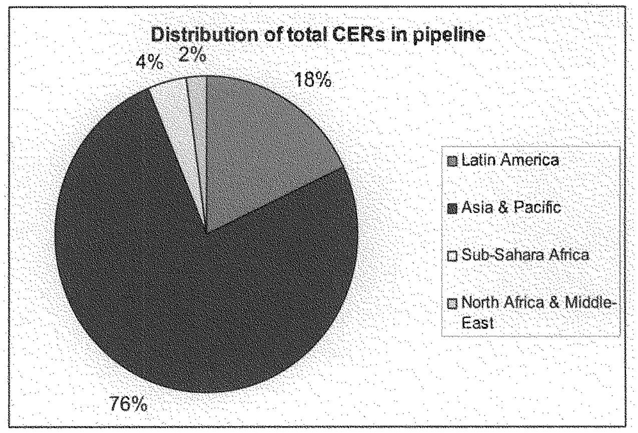
[69] GHG emission reduction by thermal oxidation of HFC 23 at refrigerant (HCFC-22) manufacturing facility of SRF Ltd (CDM0134).

[70] Project for HFC23 Decomposition at Changshu 3F Zhonghao New Chemical Materials Co. Ltd. (CDM0472)

[71] Fenhann, J. CDM pipeline, UNEP Risø Centre (01.02.07)

$2.25 billion" he estimates. [72] This might be acceptable if the money were ring-fenced for re-investment in clean technology, but the Chinese government has said that credits would be used for a range of activities other than projects that cut carbon.[73]

- Despite the nomenclature of the Clean Development Mechanism, the true development benefits of the Kyoto mechanisms are open to question. The Least Developed Countries of Africa, arguably those which stand most to gain in development terms from the CDM system, have been sidelined by the process. Most of the investment in CDM projects has been absorbed by large developing countries, such as China and India. Sub-Saharan Africa is expected to account for a negligible proportion of overall investment (approx. 4%), most of which will be directed towards Nigeria and South Africa. [74]



- This situation is to a large extent created by design flaws in the CDM rules, as the World Bank note: "in Uganda or Zambia, just around 10% of the country's population has access to the grid for electricity. Yet, a clean, grid-connected electricity project in such a country has to demonstrate under CDM rules that it displaces 'carbon-intensive' electricity on its grid; the fact that it derives mainly power from clean hydro sources is seen as a reason for it not to receive credits for proposed new clean energy sources. This unintended consequence unnecessarily punishes the poorest people in poor countries, who can least afford to use expensive diesel, kerosene or fuel-wood for their basic needs... No approved methodology exists as yet through which countries with such obvious energy needs such as these can be rewarded for clean development."[75]

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[72] http://www.adb.org/media/Articles/2006/10594-PRC-CDM-potential/

[73] *Point Carbon* (08.06.07)

[74] Fenhann, J. CDM pipeline, UNEP Risø Centre (01.02.07)

[75] World Bank, *State and trends of the carbon market* 2007

- Larry Lohman of environmental and human rights NGO The Corner House sees fundamental problems with the entire market logic of the Kyoto project system: "The biggest offset buyers want cheap carbon credits, and lots of them. The most reliable providers will be big, highly-capitalised firms or agencies in a position to hire carbon consultants and accountants, liase with officials or pay the fees needed for UN registration. Carbon-saving schemes that take the trouble to respect community rights, on the other hand, tend to be fiddly, expensive, low-yield, or difficult to implement politically."[76]

iii) Greater market uncertainty, and downward pressure on EU permit prices

- It remains the prerogative of the project's host country to decide whether or not a project meets that country's sustainable development objectives, which predictably vary greatly between different countries. The projects are then subject to approval at an international level by the UN CDM Board, who may choose to make changes. This makes it difficult to predict exactly how many CERs will be supplied, as well as leading to a range of prices for CERs. Given that the CDM Board may alter the baseline used to calculate a given project's emissions, the amount of credits generated by that project may not be as high as expected. According to the OECD, this "highlights the non-negligible risk that the proposed revenue flow generated by a project's credits will not materialise."[77]

- As discussed above, it is still uncertain how many Kyoto credits will available before 2012. UBS suggests that the supply of CDM permits "creates significant uncertainty" for phase two, and believes that the possibility of an oversupply could be enough to push demand for ETS carbon permits below the threshold required to trigger fuel substitution.[78] Economist Karsten Neuhoff, Senior Research Associate at Cambridge University, argues that "With uncertainty over future demand for JI and CDM credits from Canada, Japan, other Annex I countries, and governments of the EU Member States themselves, some market participants anticipate that the European market could be flooded by these allowances to such an extent that the EU allowance price would plummet."[79]

- Aside from CDM supply, another reason for market uncertainty is lack of clarity over actual ETS sector emissions levels. As Neuhoff argues, it is far from certain whether phase two of the ETS will create adequate scarcity of allowances and "robust" trading prices for carbon. This remains unpredictable given variables such as changes in fuel prices, uncertainty over actual emissions levels, and CDM/JI supply – all of which determine the overall scarcity of carbon. As the World Bank notes "the computation of the shortfall is a dynamic, ever-changing process, impacted by each analyst's view of technology diffusion, of fuel prices, of allowance prices, of weather and other variables. There is inherently uncertainty in such projections as each analyst projects improvements of intensity as a measure of the extent to which economic growth is likely to be decoupled from growth in carbon emissions."[80]

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[76] Lohman, L. "Carbon offsets not welcome here" www.ClimateChangeCorp.com (27.02.07)

[77] Ellis, J., Corfee-Morlot J., & Winkler, H., *Taking Stock of Progress under the Clean Development Mechanism (CDM)* (15.06.04)

[78] UBS research (05.01.07)

[79] Neuhoff, K et al., "Implications of announced phase II national allocation plans for the EU ETS", *Climate Policy* 6 (2006)

[80] World Bank, *State and trends in the carbon market 2007*

Key variables affecting carbon prices

EU emissions baseline	Supply of CDM and JI credits	Demand for Kyoto credits	Fuel prices	The actions of former Soviet states
The emissions baseline is the presumed counterfactual to what would happen if there were no emissions abatement policies in place. The baseline is driven by factors ranging from consumer demand to weather to fuel prices, and is therefore subject to variation. The baseline is crucial because it determines the level of scarcity that will be created by the emissions caps, and hence demand for credits.	The current pipeline for project based credits shows around 2bn tonnes worth of such permits for delivery before 2012. Some of these projects may not be approved, whilst the anticipated credits may not be granted by the UN CDM board. On the other hand, more projects could be proposed in the coming years. Negotiations on the post-Kyoto framework will be pivotal. If credits can be used after 2013, this will encourage more project investment before this date.	Kyoto credits will be bought by governments of EU states, Canada and Japan (as well as ETS participants) in order to help bring them into line with their Kyoto targets. The level of demand will depend upon a) political factors, such as whether these governments choose to adopt domestic reduction measures, and b) how far emissions levels in these states increase in the run-up to 2013.	The coal/ gas price ratio is crucial in making predictions on whether power generation will shift from cheap, carbon intensive coal, to cleaner, but more expensive gas. Carbon emissions must be sufficiently expensive to provide an incentive for coal to gas fuel shifting, by making it more costly to burn coal.	In theory, there is a potential supply of Assigned Amount Units (AAUs) from former Soviet bloc countries of around 7bn tonnes[81]. However, it is likely that these credit suppliers will use cartel-like behaviour to limit supply in order to maintain higher prices – if sufficient numbers of projects get off the ground. Release of credits will also be affected by the outcome of negotiations on the post-Kyoto framework. If these states can 'bank' their AAU's for future phases, they may choose to do so.

- The involvement of CDMs/JIs in the ETS – irrespective of the environmental merits of the projects that generate them – does introduce an element of further uncertainty into an EU trading system already affected by uncertainty. As the Carbon Trust argue, "The allocations may be (virtually) settled, the prospect of a completely "dead" market largely removed, and the Phase II forward price steady; but the reality remains one of huge uncertainty about the actual evolution of carbon prices out to 2012."[82] The following section explores how this lack of certainty has a detrimental impact on green investment.

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[81] See Haites, E. "Estimating the Market Potential for the Clean Development Mechanism: Review of Models and Lessons Learned", *PCFplus Report* (19.06.04); and Climate Change Capital estimates 2005

Lack of long term price signal: a fundamental problem of ETS phase two

- As Kris Voorspools at Fortis Bank notes, the phase two domestic emissions reductions he predicts (around 80-100Mt per year achieved through coal to gas fuel switching – which assumes a relatively limited availability of Kyoto credits) are not likely to be permanent solutions, and do not reduce the overall carbon intensity of the European economy. They merely offset existing emission growth trends within finite limits, without actually curbing emission increases. He argues that, "Fuel switching in itself cannot curb emissions, it can merely displace the annual emissions evolution curve up or down by 100Mt." He goes on to say that "to significantly curb the trend in emissions growth in the longer term, a different price signal is needed. This long-term price signal needs to provide an incentive to invest in technologies with a lower carbon intensity."[83] It is clear that the present system is not delivering that incentive.

- It is possible that if ETS phase two works, and Kyoto markets do not suffer a credit oversupply, there will be some temporary emissions reductions within Europe, but this is of limited value if there is no incentive provided for a more fundamental realignment to Europe's industrial base in moving towards a low carbon economy. This means that emitters – especially power generators – are highly unlikely to invest in longer term pollution-cutting projects.

- The drawn-out political wrangling over NAPs for phase two will also have a negative impact on price stability, acting as a further inhibitor to low-carbon investment. With such short notice given in respect to emissions caps, it is very difficult for businesses to make long-term plans for new investments. Legal action by Poland, Slovakia and the Czech Republic against the Commission's NAP decisions damages market certainty further. As McKinsey and Ecofys argue: "a big short-term issue for all industries is the real and perceived uncertainty about the future rules and settings of the EU ETS (and the national allocation plans), which makes it difficult for companies to decide on any long-term commitments to new investments or long-term contracts."[84]

- Without certainty, firms cannot plan to reduce emissions. As a spokeswoman for Drax power station (the UK's largest emitter) puts it: "Drax has six units, it's like having six mini-power stations on one site. We have one unit out now for repairs, it's next going to come out in 2011 because we only repair every four years. So the problem for us is that if there is no carbon price beyond 2012 why would we invest the next time we take that unit out, in a big amendment to that unit, or a big technology upgrade that would reduce our carbon, if we have no confidence that there is a price beyond that?"[85]

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[82] Carbon Trust, EU ETS Phase II allocation: implications and lessons (May 2007)
[83] Voorspools, K. "The bottom line", *Carbon Finance* (Dec 2006/ Jan 2007)
[84] McKinsey& Ecofys, EU ETS Review, Report on International Competitiveness (December 2006)
[85] BBC Politics Show (03.06.07)

- Continuing uncertainty over what will happen in phase III of the ETS is perhaps the biggest factor in the lack of long-term price signal on carbon, making it less attractive for affected companies to make carbon-reducing investments with any long-term view. In fact, present structures could create incentives to do the opposite.

- Neuhoff has highlighted a potentially serious problem with the EU ETS – "early action". Phase two allocations are being decided on the basis of 2006 emissions. This could create problems if the same approach is adopted for the post-2012 plan, as firms will anticipate reductions tied to emissions levels. This erodes the incentive for them to reduce emissions; in fact, if allocation of future permits is tied to historic emissions (as has been the case in many NAPs so far) this may create a perverse incentive to increase emissions, so as to secure larger allocations in future trading schemes.[86] In an earlier study on multi-period trading schemes, Sven Bode argued that "we found that seller and buyer have an incentive to increase output in the first period to a certain degree in order to get more allowances in the second one and thus to reduce total costs over both periods."[87] Early action reflects fundamental design flaws in the EU ETS, undermining market confidence in future scarcity, thus distorting further long-term carbon price signals.

High costs and intra-EU economic distortions

i) Large divergence between allowances and Kyoto credit entitlements for companies in different member states

- Because companies in different member states are subject to different levels of stringency in their overall emissions caps and their entitlement to use (cheaper) Kyoto credits, there will be differentiated levels of 'effort' they need to make in order to comply with the ETS.

- Gorina and Marty argue that "Distortions exist for companies located in different countries. Installations that receive a stringent allocation of allowances coupled with a low cap on the use of carbon credits are those most adversely affected." The graphs below attempt to predict indicative relative 'effort' for different member states, based on national caps vs 2006 verified emissions, adjusted for new entrants for ETS phase two. These estimates work on the assumption that the ETS works as planned, and that there is a limited supply of credits from the Kyoto markets.

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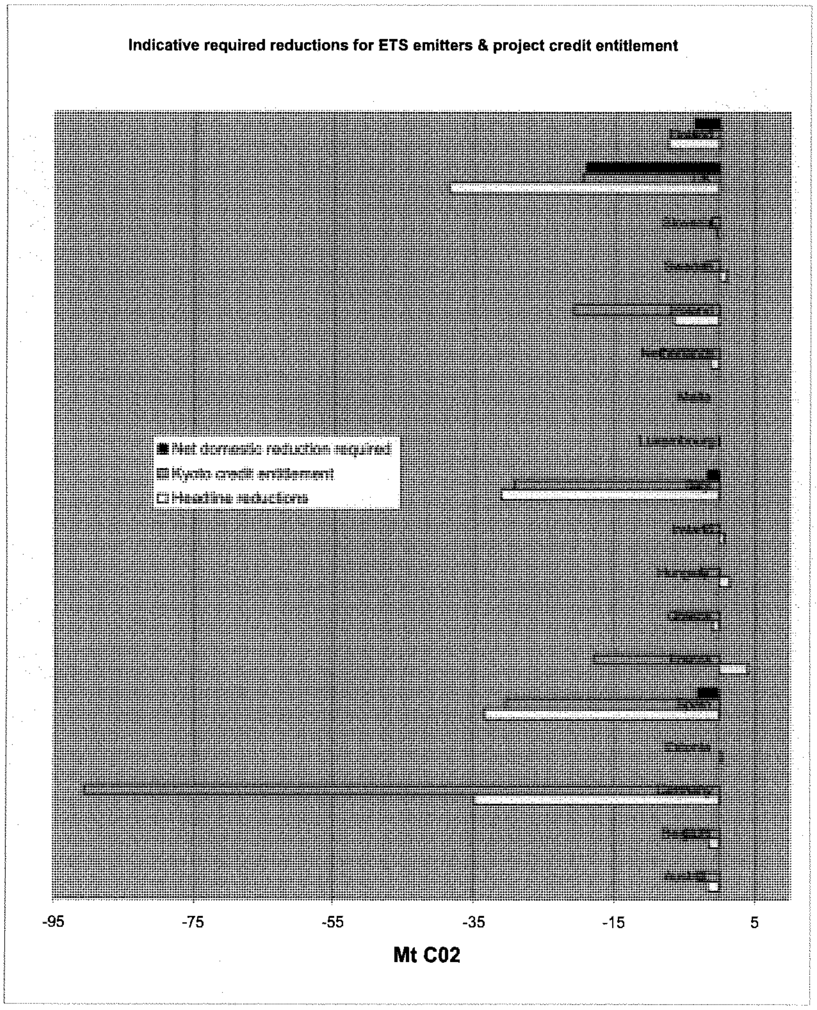
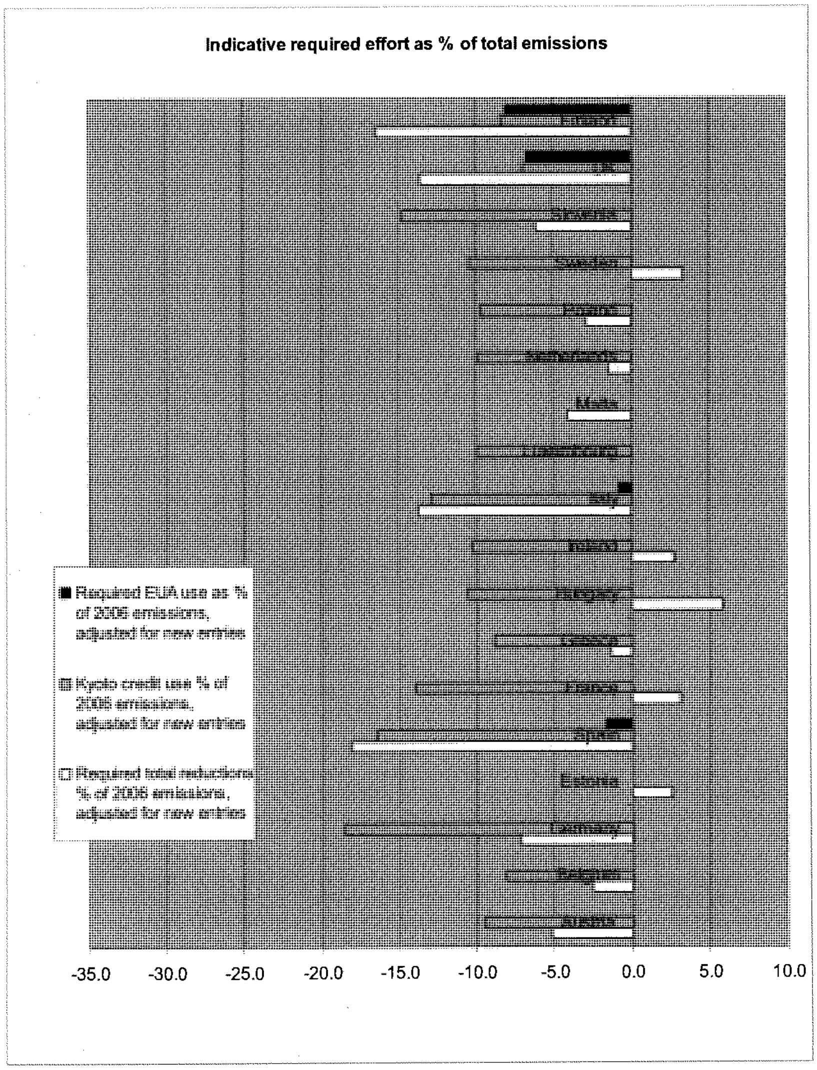
[86] Neuhoff, K. "The Decision of the Commission – one important step forward", www.climatestrategies.org (08/12/06)

[87] Bode, S. "Abatement Costs vs. Compliance Costs in Multi-Period Emissions Trading – The Firms' Perspective", Hamburg Institute of International Economics (2003)



Indicative required reductions for ETS emitters & project credit entitlement


Indicative required effort as % of total emissions
UK
Slovenia
Sweden
Poland
Netherlands
Malta
Luxembourg
Italy
Ireland
Hungary
Greece
France
Spain
Estonia
Germany
Belgium
Austria
■ Required EUA use as % of 2006 emissions, adjusted for new entries
▨ Kyoto credit use % of 2006 emissions, adjusted for new entries
☐ Required total reductions % of 2006 emissions, adjusted for new entries
-35.0
-30.0
-25.0
-20.0
-15.0
-10.0
-5.0
0.0
5.0
10.0

- Working on this basis, large emitters such as Germany, Italy, France and Spain would be able to cover all or almost all of their shortfall with Kyoto credits (subject to supply), whilst the UK having set tougher targets, would not. As Gorina and Marty note, a "trading opportunity" exists where, even if Kyoto credit supply is insufficient to cover the shortfall of the ETS, firms in those countries with higher Kyoto credit allowances would still be able to cover their own emissions with (cheaper) Kyoto permits, and could then sell on (more expensive) EU emissions permits (EUAs) to rivals in member states with stricter limits, thus making a profit.[88] This is confirmed by Louis Redshaw, head of environmental markets at Barclays Capital: "Customers are looking at selling their allowances and buying back CERs and, depending on the market at the time, being paid €5.00 to €7.00 to do so. There is a growing perception that CERs are becoming risk free and, because you can use them for compliance, it is, in essence, free money."[89]

- As in the first phase of the ETS, these distortions act as an effective subsidy (indeed, "free money") to companies in countries that have chosen not to impose ambitious emissions caps, transferring wealth away from countries which have. The UK will suffer amongst the highest costs in Europe in absolute terms in order to comply, largely as a result of its smaller project credit entitlement and relatively tough overall target. Germany, despite emitting 75% more CO2 than the UK, will pay less.

Indicative relative national costs of ETS phase two – 2006 expanded verified emissions vs phase two caps[90]

Country[91]	Cost €M (lower carbon prices)[92]	Cost €M (higher carbon prices)[93]
Austria	14.1	25.1
Belgium	12.6	22.5
Cyprus	-1.5	-2.7
Germany	293.2	523.5
Estonia	-2.6	-4.8
Spain	308.8	519.4
France	-68.3	-80.6
Greece	7.6	13.5
Hungary	-25.5	-30
Ireland	-5.	-9
Italy	277.8	477.1
Luxembourg	0	0
Malta	0.8	1.4
Netherlands	10.92	19.5
Poland	54.6	97.5
Sweden	-7.6	-13.5
Slovenia	4.5	8.1
UK	490.7	677.4
Finland	93.5	129.2
Annual total	1400	2260
Five year total	7000	11300

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[88] Gorina, N. and Marty, A. "Trading around the caps" *Environmental Finance* (November 2006)

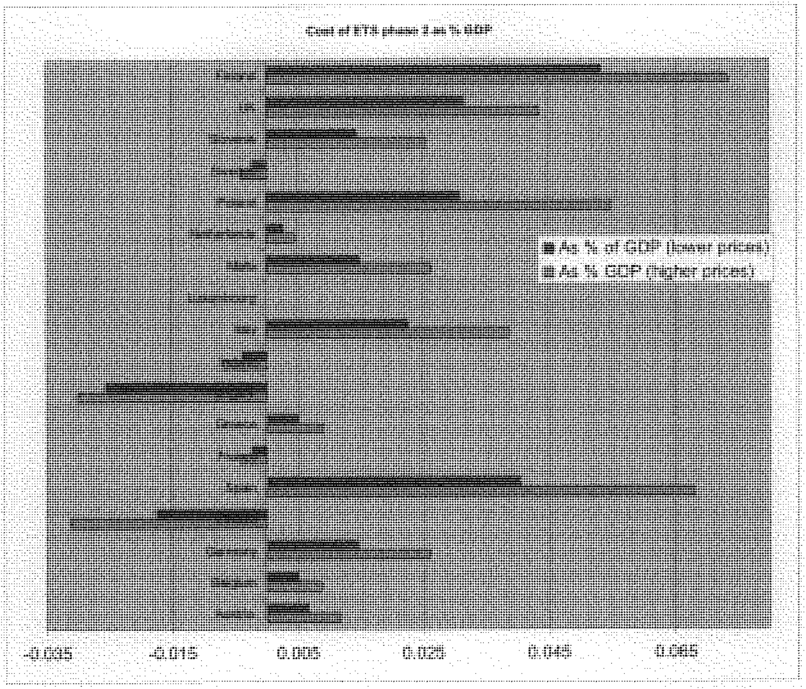
[89] *Point Carbon* (12.07.07)

[90] Countries marked in grey did not at time of writing have NAPs approved by Commission – we use estimates for caps from Fortis Bank research (January 2007)

[91] Costs for Slovakia, Denmark, Portugal, Cyprus, Czech Rep., Latvia and Lithuania are not estimated on account of incomplete/inconsistent data, or NAPs not having been finalised at time of writing.

[92] Assuming cost of Kyoto credit of €8.40 and EUA at €17 - these were average prices over 2006 (World Bank)

[93] Assuming cost of Kyoto credit of €15 and EUA at €20 (figures used in UK DEFRA RIA)



- Working on this methodology, over five years, the second phase of the ETS would cost the UK £1.6 to 2.3bn, although this remains highly dependant on carbon prices and other factors. The lower limit of these costs is in line with the UK Government's estimate, contained in Defra's Regulatory Impact Assessment, which suggests costs of £1.6bn.[94] To this can be added estimated administrative costs of £65m for the five year period.[95] Across the EU, total costs would be in the range of €6.7-11bn. As a proportion of GDP, Finland and Spain will need to spend the most.

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[94] Defra, *EU Emissions Trading Scheme Phase Two Overarching RIA* (February 2007). This document estimates the cost of buying in permits from overseas at £183m pa (or £915m over phase two). Unfortunately, the RIA does not directly attempt to quantify the cost of the UK's domestic abatements, instead choosing to refer to the need for an 11Mt reduction at an assumed cost of €20/tonne. This implies an additional £750m cost for the five year trading period (11m*20*5= €1110m = £750m), meaning a total of around £1.6bn.

[95] Based on cost curve from Open Europe NHS FOI responses, plotting cost of administration per tonne/CO2 against emissions (y = 10038x-0.6688).

ii) EU-wide costs of €15 – 20bn – if it works

- However, the above methodology cannot fully take into account the baseline emissions *growth* likely to occur in ETS phase two. The World Bank's *State and trends of the carbon market 2007*, following around 50 interviews with carbon market players, notes that "There is a consensus emerging among market analysts that the expected shortfall in the EU ETS Phase II is likely to be in the range of 0.9bn to 1.5bn tCO2e." Yet the shortfall created by running the expanded 2006 verified emissions figures against phase two caps would only create a scarcity of around 780 million tCo2E – clearly a long way below predictions, including those of Open Europe, which puts the EU-wide shortfall just below 1.35bn tonnes. Under the 780Mt scarcity scenario, Kyoto credit entitlement exceeds national scarcity in all member states except the UK, which would make compliance cheaper. This indicates that *if phase two can put a serious price on carbon*, the predicted national costs – outlined above, are probably underestimates. Therefore, if the ETS does create the levels of scarcity predicted by most observers, and if supply of Kyoto credits remains limited – the costs would be far higher. The precise costs remain difficult to predict, given the range of variables and uncertain prices of carbon. Below is a summary of our estimates, *which work on the assumption that supply of external credits to the ETS remains limited*:

Projected scarcity 2008-12	**Total costs (high carbon prices) €m**	**Total costs (lower carbon prices) €m**
Very low scarcity (0.78bn tCo2e)	11300	7000
Low scarcity (0.9bn tCo2e)	13500	7600
Mid range scarcity (1.2bn tCo2e)	19000	11800
Open Europe estimated scarcity (1.35bn tCo2e)	22000	14000
High scarcity (1.5bn tCo2e)	25000	16900

- Although considerable uncertainty remains, the above estimates suggest that **EU-wide costs in the region of €15 – 20bn** (£10 – 13.5bn) over the five year period are realistic. The Commission's 2003 impact assessment suggests costs of €11 – 14bn.[96] Is this a price worth paying to fight climate change? Working on the basis that (if supply of external credits to the ETS remains fairly low) around 1bn tCO2e of emissions 'reductions' would be imported in the form of Kyoto credits. This implies that €8.5 – 15bn of this expenditure would be directed towards Kyoto projects, many of which are subject to the serious deficiencies set out above. No more than a quarter of this investment in CDMs is likely to go towards renewable energy projects, a sustainable form of development that equates to real emissions cuts. Given that such huge amounts of investment will be wasted on exotic gas capture projects (probably around €3.2 – 5.7bn from the ETS), the system established by the ETS and the linked Kyoto carbon markets is clearly not a rational or effective use of developed world resources in combating climate change.

- As it is difficult to estimate how emissions growth will be distributed between member states, it is uncertain how much the estimates for individual national costs will have to be revised upwards from those listed above, should the scenario described above occur.

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[96] EU Commission, *Staff working paper on the directive of the European Parliament and Council amending Directive establishing a scheme for greenhouse gas allowance trading within the community, in respect of the Kyoto Protocol's project-based mechanisms* (23.07.03).

iii) Could increase future burdens for non-ETS sectors

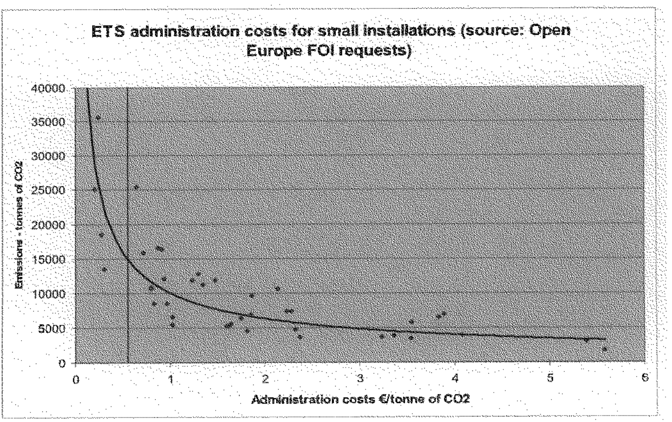
- The net result of failing to significantly reduce overall carbon intensity amongst the large installations included within the ETS will mean that if the EU attempts to meet its notional targets for cutting real, domestic emissions, the burden of investing in cleaner technology will fall in other areas of the economy, where it is likely to be proportionately more expensive to achieve this goal.

- As has been argued in many previous studies[97], the costs of emission abatements in the traded sector are lower than those in the rest of the economy. This implies that the sectors of the economy covered by the ETS should actually be contributing proportionally more to absolute reductions in Europe's emissions, rather than less, as was the case in phase one ETS, and will remain the case in phase two.

Irrational allocation remains – small installations suffer disproportionately

- Data obtained by Open Europe through Freedom of Information requests to NHS hospitals suggests that the costs of compliance with the EU ETS are inversely proportional with the size of the installation. In relative terms, small installations therefore pay more. The total costs to the NHS were nearly £6m (€8.5m) in phase one, around £1.5m of which were administrative costs. Our survey shows that very small installations – generally those producing below around 15,000 tonnes of CO2 per year – suffer particularly disproportionate compliance costs compared to other installations above this threshold.

- If we analyse the UK's phase two national allocation plan in its entirety, we see that a very large number of smaller installations (those emitting below 15,000 tonnes of CO2) are included in the scheme) 454, or 43% of the total. Yet these installations account for just over 3Mt of C02, out of a total of 281Mt. This is equivalent to just over 1% of UK ETS emissions.


ETS administration costs for small installations (source: Open Europe FOI requests)

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[97] Including Böhringer et al. 2005; Böhringer et al. 2006; Criqui, Kitous 2003; or Peterson 2006)

- The UK Government has publicly admitted this problem, and indeed has tried to relax the requirements of the ETS Directive in order to allow smaller installations to opt out of the scheme in phase two.[98] However, the overall number of UK installations involved in the EU ETS has remained fairly constant: 1,062 installations were involved in ETS phase one, whilst 1,065 were involved in phase two. As noted above, there are still very large numbers of small emitters, accounting for a tiny proportion of overall emissions, who remain within the scheme.

- As Cédric Philibert and Julia Reinaud of the International Energy Agency note, "Emissions trading is cost-effective only in effective markets. High transaction costs and various market failures may reduce the cost-effectiveness of emissions trading schemes." Lowering transaction costs will promote greater scarcity in emissions trading markets. Tietenberg writes that "the evidence seems to suggest that, by lowering compliance costs, tradable-permit programmes facilitate the setting of more stringent caps." Therefore, making carbon abatement cheaper is not only economically desirable, but also environmentally desirable. Abatement within a given economy is likely to be more effective and far reaching if the costs are reduced as far as possible.

- The economic case for lowering transaction costs is strong, yet the EU ETS in its first two phases has not taken account of the negative effects of including large numbers of small emitters in a scheme characterised by heavy administrative burdens, reflecting the lack of proper cost-benefit analysis that underpins the scheme.

Relocation and avoidability – an environmental and economic problem

- There is little evidence to suggest that the EU emissions trading scheme has so far caused business to relocate offshore. However, since phase one was over-allocated, this lack of evidence is not particularly relevant. Tighter allocations in phase two are likely to give a far clearer picture as to whether the European trading scheme could create incentives for business to move overseas.

- The risks of competitive disadvantage are not distributed equally amongst installations involved in the ETS. For certain industries able to pass through the cost of carbon (for instance power generators), involvement in carbon trading is not so much of a problem. Indeed, firms in Britain are believed to have made £2bn in windfall profits through phase one of the ETS.[99] However, there is some risk of a transition of production away from the EU among certain industrials as a result of the ETS. Firms could reduce their production, so that their emissions slump below their allocated levels. They could then sell the excess permits and use their savings to invest elsewhere. According to Cedric Philibert and Julia Reinaud:

  "*Emissions trading has the potential to significantly affect the prices of electricity and thus the price of energy intensive products. Furthermore, international trade in goods which are energy intensive tends to favour the economies of non-participants in an international trading scheme. Key effects on non-participants have been examined in many models. One consequence of carbon control is that carbon-intensive economic*

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[98] Defra, ETS Phase two Overarching Regulatory Impact Assessment (August 2006)

[99] Reported in *Sunday Times* (03.06.07)

activity may have an incentive to migrate from countries where it is penalised to non-participative countries where production may become more profitable. Clearly, however, costs associated with greenhouse gas abatements will only be one element amongst many others in firms' decisions about where to locate their activities and investments. But for some energy intensive industries at least, carbon costs may become more important as the cuts get progressively deeper."[100]

- According to the Carbon Trust, a €25/tonne cost of CO2 could lead to price rises of 7.3% in the steel industry. Steel accounts for 10% of emissions in the EU ETS. Given the small margins and ongoing global consolidation of this industry, the possibility of multinationals adjusting their levels of regional activity as a result of carbon prices is very real.

- A report for the EU Commission by McKinsey and Ecofys notes that "the increase in pressure in the direction of potential production shifts might be significant for some industries in international competition. With the allocation of CO2 allowances based on historic emissions – which is largely the case in the current EU ETS – the marginal cost increase can be very significant."

- The report also singles out steel, but puts the marginal costs higher than the Carbon Trust estimates, and believes the sector may be pushed offshore. The study works on the basis of a €20/tonne price of carbon: "In the steel sector, the integrated production route (BOF) is expected to be impacted in its competitiveness. In some cases, production might be relocated to other areas. The situation could worsen over time given the usual continuous de-bottlenecking of capacity that might not be covered by free allowances. The additional costs of about 17% on the marginal unit of steel production may create an incentive to shift marginal production into regions without those costs."

- The report notes that "the possibility of production shifts and CO2 leakage in the cement industry is real", and finds that "the impact on the cost of the marginal unit of production in the cement industry is very significant at over 36% or 12 Euro per ton of cement, which is roughly equal to freight costs from northern Africa or the eastern European countries outside the EU to Antwerp", meaning production could be relocated to these areas.

- Aluminium production as a sector is currently excluded from the ETS on account of its high exposure to international competition. However, the indirect cost of higher electricity prices could nonetheless harm the future of this industry in Europe: "Primary aluminium production is under heavy pressure in the short and mid term, because the probable large indirect cost increase resulting from the EU ETS is not covered by any free allowances. This might accelerate a migration of primary aluminium to countries with lower electricity cost and/or higher CO2 efficiency", notes the report.[101]

- Relocation of business to other parts of the world would not only be an economic loss to Europe, but also an environmental loss globally, as industry moves to regimes with less stringent emissions controls.[102] In addition, this relocation would drive down carbon prices in Europe, as a result of decreased overall scarcity in the ETS. It would also raise the risk of prompting the EU to move towards imposing higher tariffs on goods in countries deemed to be 'slacking' on fighting climate change, as has been suggested by the French government. This could open the possibility of serious abuse of 'green' trade barriers by protectionist interests, and damage the scope for future international cooperation on climate change, as the Stern Review has argued.[103]

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[100] Philibert, C. & Reinaud, J. "Emissions Trading: Taking Stock and Looking forwards" International Energy Agency/OECD, (2004) pg.21

[101] McKinsey& Ecofys, EU ETS Review, Report on International Competitiveness (December 2006)

[102] See CEPS, *The EU ETS – Taking stock and looking ahead* (April 2006)

Auctioning still has not been properly utilised: problems of free permit allocation will continue in phase two

- In phase one of the ETS, the allocation of free permits allowed power generators to make windfall profits, originally estimated at €800m-€1bn in the UK alone in phase one. Across the EU, this figure was estimated at €6-8bn.[104] However, more recent figures from Point Carbon estimate far higher UK-only costs of £2bn over phase one.[105]

- The lesson learnt from phase one should have been that the more the system moves towards non-free allocations, the less likely it becomes that power-generators will try to take advantage of the system in the manner they have in the past. If power generators have to pay for more of their allowances, they may be more willing to reduce their emissions.[106] More auctioning provides stronger incentives to reduce emissions towards a "zero carbon" baseline, as opposed to simply moving them below the free allocation limit, or passing costs on to customers without investing in improvements. The IPPR recommends an eventual target of 100% auctioning.[107]

- However, ETS phase II does not address this issue. In fact, it places a 10% upper limit on the numbers of allowances that can be auctioned in theory, and even fewer have been in practice – just 1.5%. This means that a negligible number of permits will be auctioned between 2008 and 2012. Neuhoff argues that not only are differential levels of free allocation between member states distortative, but they also represent a subsidy to coal generation: "Any free allocation represents a subsidy – and where only fossil-fuel generation is subsidized, this distorts investment choices in favour of fossil-fuel generation. Where coal receives a higher allocation than gas, the investment choice is, in addition, distorted towards coal. The level of such subsidies under proposed second-phase NAP is so high that the construction of coal power stations is more profitable under the ETS with such distorting allocation decisions than in the absence of the ETS."[108]

- The Carbon Trust argues that "By far the biggest potential for the EU ETS to generate perverse incentives is in the allocations to new entrants, through the 'New Entrant Reserves'. The fact that new emitting sources get free allowances but zero-carbon power sources do not obviously weakens incentives to invest in the latter. This problem is exacerbated by specific details in many of the plans. Most notably, the German NAP offers unlimited 'technology specific' free allowances to new power stations, so that coal power stations get about twice as many as gas, and adds a 'load factor' correction, in which the most polluting plants (lignite) are granted an *additional* 10% more allowances, officially on the grounds that they are expected to operate more.... many countries offer such fuel-specific subsidies for new entrants, but Germany is unique in the scale of subsidy offered to the most polluting ones."[109]

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[103] *Stern Review: the economics of climate change*, pp. 486-487

[104] German Environment Ministry, cited in Smith K. "Pollute and Profit", *Parliamentary Brief Magazine* (May 2007)

[105] Reported in *Sunday Times* (03.06.07)

[106] Deutsche Bank Research (06.03.07)

[107] Gibbs, T. & Retallack, S. *Trading up – reforming the European Union's Emissions Trading Scheme*, IPPR (December 2006)

[108] Neuhoff, K. et al., "Implications of announced phase II national allocation plans for the EU ETS", *Climate Policy* 6 (2006)

- The Commons Environmental Audit Committee expressed its disappointment over the auctioning regime, arguing:

  "One decision on the shape of Phase II, which will have a profound effect on its efficiency and effectiveness, and with which we are signally disappointed, was taken long in advance: the maximum limit of allowances which can be auctioned. Under the ETS Directive, a maximum of only 10% of allowances can be reserved for auction in Phase II, rather than being allocated to firms for free. We believe it was wrong of Member States and the Commission to impose such a restrictive limit on auctioning in Phase II. In our view, auctioning allowances should lead to more accurate allocations, reduced public costs and bureaucracy, and greater internalisation of environmental costs in business decisions. In sectors where there are not strong concerns as to the effects on competitiveness of requiring firms to purchase their allocations upfront, we strongly support 100% auctioning. In auctioning 7% of its Phase II NAP, the Government is doing far more than any other Member State in this Phase, but this level is still far less than the participants could withstand and which would be good for the Scheme as a whole."[110]

Emissions trading remains vulnerable to gaming

- The huge size and complexity of the ETS makes it vulnerable to pressure from industrial lobby groups, particularly in strategic industries with strong ties to government. As the Carbon Trust note, "Phase I had shown the huge potential financial value of emission allowances – against a background of prices exceeding €20/tCO2, it was plain that governments were allocating assets worth probably more than €200bn in total. Not surprisingly, they were subject to huge lobbying pressures."[111] As well as the established industrial lobby groups, there are now bodies specifically representing those with a stake in the carbon trading industry, the most prominent being the International Emissions Trading Association, which represents project developers, intermediaries, financial institutions, brokers involved in a new economic activity as a result of the greenhouse gas market, together with "industrial organizations that will want to use CERs to meet existing or future regulatory constraints."[112]

- The power sector has been particularly adept at exerting influence in carbon markets; having secured overgenerous allowances in phase one, utilities firms simply passed the costs of buying new credits on to consumers, making huge windfalls from the scheme. In the UK alone, analysis by IPA Energy Consulting Ltd carried out for the DTI estimates the potential for an increase in generator profit in phase I of £800 million a year, implying a maximum of a 25% uplift on energy prices.[113] The second phase has seen continued lobbying pressure on national governments – particularly Berlin – attempting to secure lax emissions caps and other concessions to industry.

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[109] Carbon Trust, *EU ETS Phase II allocation: implications and lessons* (May 2007)

[110] House of Commons Environmental Audit Committee, Second Report, *The EU Emissions Trading Scheme: Lessons for the Future* (01.03.07)

[111] Carbon Trust, EU ETS Phase II allocation: implications and lessons (May 2007)

[112] www.ieta.org

Carbon taxes vs carbon trading: the debate

Trading, as a market based solution, should allow emissions abatement to take place where it is cheapest. It also enables policy-makers to make a rational assumption on the level of abatement that will occur, based on the scarcity of allowances created by the trading system. On the downside, it is becoming increasingly clear that emissions trading is open to gaming and lobby group pressure. The huge size and complexity of the ETS makes it particularly vulnerable in this respect. It could be argued that trading has been adopted as a policy partly for this reason – because it is more politically palatable than taxation. Put simply, it was the easier choice.

Taxation has the advantage of delivering less predictable levels of emissions abatement at a definite cost, and therefore allows companies to judge accurately how much they will need to invest in order to cut their emissions (and hence save money). Trading is less likely to deliver this long term price signal (the ETS has so far been marred by huge volatility), meaning it is questionable how effective it is in stimulating long term 'green investment'.

- In phase II, it is already evident that powerful lobbying has had important effects on the national allocation plan of Germany, Europe's largest economy and largest source of emissions. One highly important concession made to Berlin was guaranteed free permits for new power plants, described in more detail in the previous section. Deutsche Bank notes that for Germany, "The NAP 2 contained only a few incentives for switching to less CO2-intensive sources of energy e.g. from coal to gas) as part of the modernisation of Germany's outdated power plants that will occur over the next few years. New power stations are to be allocated the emissions allowances they require for standard operation absolutely free of charge regardless of the fuel they use."[114] As the Carbon Trust have noted, free permit allocation to new entrants effectively provides positive incentives for the construction of new high-pollution installations. Germany's NAP is one of the main offenders in this regard. They argue that:

  "Essentially, what is happening here is that whilst the EU ETS was designed with the intent to reduce CO2 emissions, in many Member States the details of implementation have been negotiated between industries and Ministries that had other objectives, and whose main priority was to minimise any resulting pressure on their industries to change: they appear to have regarded their job as protecting 'business as usual' from the effects of a carbon price in Europe. In some countries, particularly concerning new investments, they succeeded to a remarkable degree."[115]

- Germany will also be allowed to import more Kyoto credits than originally proposed. Following a dispute between the European Commission over the country's phase two national allocation plan (NAP), Berlin agreed to accept a 2.5 per cent cut in its proposed CO2 emissions allocation in return for an increased limit on the number of CERs that can be imported. Instead of the original 12 per cent limit on these imports, the government and German companies liable under the EU ETS will be able to meet the overall national emissions target by purchasing up to 20 per cent of their allocation from credits generated under the CDM and JI mechanisms. As Point Carbon notes, "This means that German operators can purchase 90.6 million CDM/JI credits in the market, instead of the 57.8 million allowed under the previous version."[116] This means 164Mt extra over 5 years. Again, this clearly goes against the principle that overseas project credits should merely be "supplemental" to domestic emissions reductions, and makes it far more likely that EU installations will be able to cover any shortfall through use of external credits.

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[113] Environmental Audit Committee (05.07.06)

[114] Deutsche Bank Research, *EU Emissions Trading – Allocation battle intensifying* (06.03.07)

[115] Carbon Trust, EU ETS Phase II allocation: implications and lessons (May 2007)

- The negotiations over Germany's NAP say a great deal about the underlying problems associated with emissions trading, and its vulnerability to manipulation by rent-seeking interest groups. This is not a problem likely to be resolved through greater centralisation of national allocation plans, as some have suggested (for example, the IPPR). Further centralisation will not make the system immune to the underlying problem of lobby group pressure, and corporatist interests seeking to profit at the expense of both the wider environmental interest, and that of the European economy. In fact, poor transparency in EU decision making, together with a well established existing lobbying 'infrastructure' in Brussels could even make the problem worse.

- There may be more fundamental problems associated with handing permit allocation decisions to bureaucrats, which is by definition necessary in 'state constructed' markets such as those for carbon. John Kay, writing in the FT noted that, "when a market is created through political action rather than emerging spontaneously from the needs of buyers and sellers, business will seek to influence market design for commercial advantage."[117]

- The Carbon Trust argues that: "The politics of implementation inevitably involve a risk of what social scientists call 'regulatory capture', in which industries effectively control their regulators; by establishing a close relationship particularly with industry ministries, they seek to adjust rules of implementation so that they can carry on with 'business as usual', or better. That in essence is the story of Phase II implementation details in much of Europe."[118]

- Catrinus Jepna of Netherlands-based climate change NGO Foundation JIN summarises the structural weaknesses in the present system of bureaucratic allocation of emissions caps:

  "*... the allocation process is the weak spot of the trading scheme and hard to be done correctly, because: bureaucrats/politicians who take decisions about allocations, suffer from information asymmetry as the best information about realistic allocations is with the installations, not with them. The management of the installations knows which mitigation technologies can be introduced, are available, in the pipeline, etc., or what their investment plans are; bureaucrats can only guess... it is not in the installations' interest to provide the bureaucracy with all such*

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[116] Point Carbon, *Carbon Market Europe* (23.02.07)
[117] FT (08.05.06)
[118] Carbon Trust, EU ETS Phase II allocation: implications and lessons (May 2007)

information. Instead, they have an incentive to show that emission reductions will be very difficult to realize and costly."

- Traders are another group with an incentive to influence carbon markets for their own gains. Alongside the established specialist carbon funds, hedge funds and other institutional investors are expected to invest heavily in carbon credits, especially after carbon credits held in offshore accounts now benefit from tax breaks announced in the UK's 2007 budget. Jepma argues that:

  "Credit traders want to do business. At the start of a scheme, they leave market players with the impression that credits are scarce and thus induce nervous players to buy credits early in order to be sure about compliance later on. The players 'with the strong nerves' will probably wait until prices have been driven up sufficiently for their credit sales, but once prices start falling, they may fall over each other and make prices collapse. We have seen this process happening during the first phase of the EU ETS."

- Jepma concludes that because of the structural weaknesses in the ETS, and the predicted oversupply of Kyoto credits, phase two could well follow the same path as phase one: "there are fairly strong arguments to support the view that even during the Kyoto Protocol's commitment period (which coincides with the EU ETS 2nd phase), a similar pattern of slightly rising but eventually almost collapsing credit prices may take place."[119]

- Trading systems on the model of the ETS need to take place on a phase by phase basis. Longer phases should facilitate investment decision making; at the moment there is no way to know what will happen after phase two (it is difficult enough to know what will happen *in* phase two). But on the other hand, it is necessary to progressively lower the overall cap between phases in order to maintain scarcity, meaning that phases cannot be too long. Short phases also enable regulators to correct problems with the system with greater agility. A November 2005 survey by McKinsey and Ecofys for the European Commission found that 93% of businesses wanted the trading period extended to ten years or more. However, governments are unlikely to agree this as it means that caps can only be revised down every ten years, and so the path of emissions reductions would have to be very gradual (which is why none of the Government bodies surveyed agreed with this idea).[120]

- This dilemma, together with existing volatility within a given trading phase, poses more fundamental questions over the ability of emissions trading systems to effectively deliver incentives for green investment through delivery of a firm price on carbon. Critics see this as an important flaw. Professor Tom Burke at Imperial College London argues that emissions trading "produces very volatile signals for investors as to what they need to do". He believes that trading will only "affect things at the margin", and more effective action – involving public expenditure and regulation – will become necessary to make a serious effort against climate change. He said, "the point about markets is that prices change and are volatile as behaviours change. If you want investment made over 30, 40, 50 year periods, then you need a signal that's much stronger".[121]

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[119] *Joint Implementation Quarterly*, (April 2007)

[120] "Review of EU Emissions Trading Scheme: Survey Highlights." November 2005. McKinsey & Company, Ecofys

[121] Interview, BBC Radio 4 Today Programme (07.06.07)

Looking forwards: what future for the ETS?

- The EU's January 2007 Energy Policy for Europe urges member states to make ambitious cuts in greenhouse gas emissions through a "post-industrial" revolution – the Plan envisages a 20% unilateral cut in emissions on 1990 levels, or 30% if conducted in concert with other major economies. In March 2007, EU leaders stated the bloc's commitment towards "transforming Europe into a highly energy-efficient and low greenhouse-gas-emitting economy", formally committing themselves to these targets.

- However, it is clear that if the EU is serious about tackling climate change, far more effective policies will be necessary in order to ensure that emission reductions take place at home, and are not simply bought in from overseas. The EU Commission (like the UK Government) at this stage seems committed to emissions trading as its main strategy for combating climate change beyond 2013, arguing that "Emissions trading schemes will be a key tool to ensure that developed countries can reach their targets cost-effectively."[122] This apparent inflexibility may stem from the political capital that has been staked on the ETS to date, or the fact that trading systems are more politically 'safe' than alternatives, such as taxes. Yet, as has been argued, the system is hampered by serious design flaws. This will not be solved through further centralisation – whether the allocation process is undertaken at national or EU level does not alter the underlying problem seen so far in both phases of the ETS – bureaucracies are generally not well positioned to judge what caps should be imposed, whilst participants will generally exert pressure on the bureaucracy to affect these decisions.

- As long as permits are allocated and not auctioned, the system is not going to be worth having. As well as unintentional distortions caused by the handing out of free permits, there is clear evidence that the system of free allocations is very vulnerable to lobby group pressure, and is also being deliberately used to provide covert industrial subsidies to polluting industries. The problems with the present system – most notably the level of lobby influence – can be mitigated through moves to 100% auctioning, but this may take some time to happen, and is likely to face political resistance. Improvements could also be made by raising the threshold for inclusion in the ETS, so that so many small installations are not drawn in.

- Setting the issue of auctioning aside, getting the overall allocation of permits 'right' is not easy. It involves making a series of guesses about future economic growth, future energy prices, and changing technology. Misjudging these variables will mean harmful price volatility, the possibility of overallocation (as in phase one), or of levels of scarcity so high as to be economically harmful.

- It should also be considered that the ETS is not the only climate policy being pursued by governments and indeed it cannot be. Yet its interaction with other tax and subsidy policies has the potential to cancel out their intended effects. If for example, member states subsidise the large scale building of renewable power plants, then the effect will simply be to reduce the price of carbon in the system (and therefore increase emissions elsewhere). The goal of the ETS is to make efficiency gains by avoiding distortions – but other climate policies are at the same time effectively trying to pre-empt the operation of the market and artificially tilt investment in their favour.

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[122] EC Communication 5422/07, pg.9

A whole range of other taxes, subsidies, and regulations mean that the goal of a completely undistorted market may be a mirage.

- The distorted incentives and powerful political interests created by the ETS and linked Kyoto mechanisms continue to act as barriers to meaningful action on climate change. If trading is to be continued as a policy, it seems certain that current 'leaks' threatening to flood the market with external credits must be rectified and longer term price signals are established within the traded sectors. Yet Europe must also explore the viability of other policy options for emissions reduction, most obviously taxes. Otherwise, the mooted "post-industrial" revolution in Europe will remain little more than a pipe dream.

- The attempt to create a global carbon market and a "global price for carbon" through trading is unlikely to be successful. The costs of dealing with the effects of climate change will not be distributed equally (Bangladesh will suffer far more than Russia, for instance), whilst a global consensus on how to share the burden of abatement policies is still a long way off. The current Kyoto framework has been crippled by the imbalances created by large emitters opting out (such as the US), and ratifiers backsliding on their commitments (especially Canada). International action should focus on setting tough and enforceable national targets for greenhouse gas reduction. How to reach those binding targets should be up to individual countries.

- There are many who see the ETS as the starting point for a global carbon trading market. However, the problems of allocation seen in the ETS offer a sobering insight into how this could be magnified in the context of negotiating such a global system. The huge imbalances in the current Kyoto system also add to this impression – clearly, factors such as the settlement upon the 1990 baseline were politically motivated, intended as a way of buying Russian support for the Protocol. In current talks on the successor to Kyoto, it is proving difficult enough for major polluters to even agree the overall targets. Trying to also agree on the policies to meet them would be likely to impede agreement – particularly given that countries like China favour radically different approaches. An intergovernmental, target-based agreement is therefore politically a more plausible successor to Kyoto than the creation of a single supranational trading system.

Annex

National Allocation Plans and verified emissions for phase one and phase two ETS

Member State	*1st period cap*	*2005 verified emissions*	*2006 verified emissions (adjusted for new entries)*	*Proposed cap 2008-2012*	Cap allowed 2008-2012	*Allowed CDM/JI limit (%)*	*Kyoto credit entitlement*
Austria	33	33.4	32.4	32.8	30.7	10	3.1
Belgium	62.08	55.58	60	63.33	58.5	8.4	4.9
Cyprus	5.7	5.1	5.3	7.12	5.48	10	0.5
Czech	97.6	82.45	83.6	101.9	86.8	10	8.68
Estonia	18	12.62	12.4	24.6	12.7	0	0
Finland	45.5	33	45	39.6	37.6	10	3.76
France	156.5	131.3	128.8	132.8	132.8	13.5	17.9
Germany	499	474	488	482	453.1	20	90.6
Greece	74.4	71.3	70	75.5	69.1	9	6.2
Hungary	31.3	26	25.4	30.8	26.9	10	2.7
Ireland	22.3	22.4	21.7	22.6	22.3	10	2.2
Italy	223.1	225.5	227	209	195.8	15	29.4
Latvia	4.6	2.9	2.9	7.7	3.43	10	0.34
Lithuania	12.3	6.6	6.7	16.6	8.8	20	1.76
Luxembourg	3.4	2.6	2.7	3.95	2.7	10	0.27
Malta	2.9	1.98	1.98	2.96	2.1		0
Netherlands	95.3	80.35	87.1	90.4	85.8	10	8.58
Poland	239.1	203.1	215	284.6	208.5	10	20.9
Slovakia	30.5	25.2	27.2	41.3	30.9	7	2.2
Slovenia	8.8	8.7	8.84	8.3	8.3	15.76	1.31
Spain	174.4	182.9	185.9	152.7	152.3	20	30.46
Sweden	22.9	19.3	21.9	25.2	22.8	10	2.28
UK	245.3	242.4	284.96	246.2	246.2	8	19.7
Total for approved NAPs	2102.28	1943.58	2039.40884	2094.84	1903.1	13.60%	257
Denmark	33.5	26.5	34.2	24.5	22	10	2.2
Portugal	38.2	36.4	33.1	37.9	34.3	10	3.4
Total for all NAPs	2179.68	2011.58	2107	2164.36	1960	13.5	265
Over 5 years				10821.8	9802	13.5	1326

All figures MtCO2eq., last updated 30.07.07 Those in grey are estimates, given that two NAPs had not been approved at time of writing.

Projected effects of phase two ETS

	If Kyoto credit supply is limited to 1300mt[123]
Total projected annual emissions baseline [124]	2226
Total projected emissions for 5 years	11130
Five year total permitted emissions	9802
OE projection of total shortfall for phase 2	1328
Average annual shortfall for phase 2	267
Estimates CER/ ERU supply for 5 years	1300
Total shortfall for 5 years, after Kyoto credit imports	35
Required annual ETS sector domestic abatement	7
% shortfall achieved in EU	**2.1**
% shortfall achieved through Kyoto mechanisms	**97.9**

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[123] Projection by Point Carbon (June 2007)

[124] From Neuhoff, K. et al., *Emission projections 2008-2012 versus NAPs II* (26.09.06). Average of business as usual projections under no ETS scenarios; new entrants not included.

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